IMPERIAL MYCOLOGICAL
18 DEC. 1931
INSTITUTE

BERMUDA

REPORT

OF THE

DEPARTMENT

OF

AGRICULTURE

FOR THE YEAR

1930

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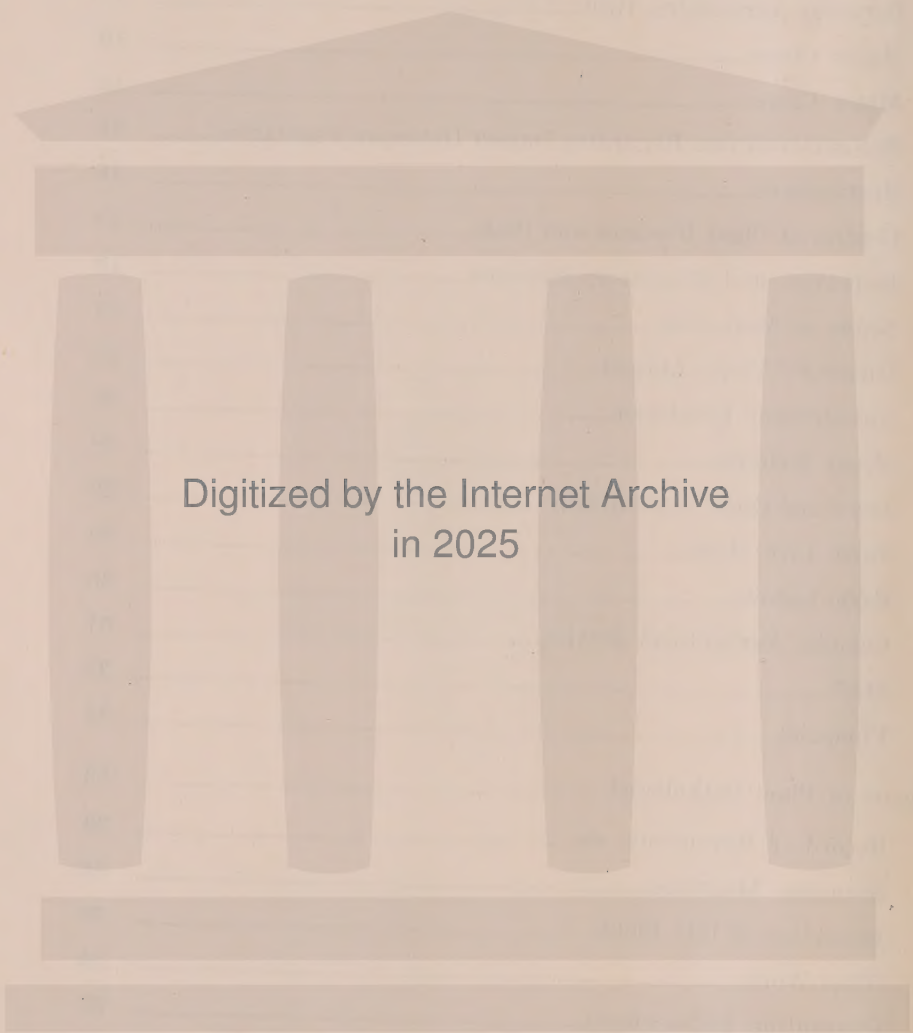

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Board of Agriculture, 1930

Honourable S. S. SPURLING, C.M.G., O.B.E., M.C.P., St. Georges, Chairman.
Wor. B. C. C. OUTERBRIDGE, J.P., M.C.P., Smiths, Deputy Chairman.
Mr. F. C. MISICK, M.C.P., Sandys.
Mr. W. A. H. BARNES, Southampton.
Mr. F. W. STEPHENS, Paget.
Mr. JOS. DE MOURA, Southampton.
Wor. T. H. H. OUTERBRIDGE, J.P., M.C.P., Hamilton.
Mr. JNO. SIMONS, Paget.
Mr. W. J. H. TROTT, M.C.P., Pembroke.

TEMPORARY APPOINTMENTS

In effect from 25th August

Mr. G. S. PATTON, M.C.P., Warwick, Acting Chairman, to 7th October.
Mr. J. D. B. TALBOT, M.C.P., Pembroke, to 30th September.
Mr. F. A. HOLLIS, Pembroke. During his acting appointment Mr. Hollis was absent from the Colony.

Department of Agriculture, 1930

Director of Agriculture, E. A. MCCALLAN.
Plant Pathologist, H. S. CUNNINGHAM, Ph.D., M.S.A., B.S.A.
Agricultural Assistant, W. R. EVANS.
Inspector of Produce, E. L. ADAMS.
Horticulturist, J. C. NAUEN.
Clerk, HILDA C. LINES.

Part-Time Officers.

Government Veterinary Officer, R. L. TUCKER, D.V.S., to 8th November.
C. J. COOPER, V.S., from 9th November.
Assistant Inspector of Produce, T. ARTHUR HOLLIS.
Sub-Inspectors of Produce, C. V. S. EARLY, J. W. M. GIBBONS, T. J. OUTERBRIDGE.

Agricultural Station,

Bermuda,

24th September, 1931.

Sir,

I am directed by the Board of Agriculture to lay before His Excellency the Governor, for the information of the Legislature, the accompanying report of the Department of Agriculture for the year ended 31st December, 1930.

I have the honour to be,

Sir,

Your obedient servant,

HILDA C. LINES,
Clerk, Board of Agriculture.

The Honourable,

The Colonial Secretary,

Hamilton.

Report of The Director of Agriculture, 1930

The Chairman,
The Board of Agriculture,

I have the honour to submit herewith my report for the year 1930, together with reports from other members of the Department.

AGRICULTURAL STATION

A statement of the work performed at the Station follows:

Vegetable Tests.—Samples numbering 349 were tested; some for viability only.

Viability Tests.—The samples submitted for viability check tested as follows:

Germination very good and good	80.5 per cent
Germination fair	6.5 " "
Germination poor	5.0 " "
Germination very poor or failed	8.0 " "

The vegetable seeds sold in Bermuda are as true to type as commercial seeds generally.

Field tests were made with many varieties and strains of vegetables. The season, on the whole, was unfavourable. Following are brief notes on the vegetables tested.

Beans, French or Dwarf.—Eleven samples tested. Tennessee Green Pod is earlier and a heavier bearer than Bountiful, but somewhat coarser; both are recommended. Canadian Wonder is a hardy variety recommended to home gardeners. The season was very unfavourable for beans.

Beets.—Eighteen samples tested. Crosby's Early Egyptian is recommended for the Canadian market. Early Wonder is also a suitable variety. Beets should be kept constantly dusted or sprayed with arsenical poison to prevent injury by fire-worms.

Broccoli, Italian Green Sprouting.—Calabreise, Calabrese (also applied to a white heading broccoli), Glory of Calabria, Green Heading, New York Market, Riviera and Sprouting Annual are some of the trade synonyms of this much-advertised broccoli. Two samples tested. This new vegetable is highly suitable to local conditions. It is a much more certain cropper than cauliflower. If seeded in September it should be ready

for the first cutting in December, for ten to twelve weeks is sufficient to bring it to maturity. Frequent cuttings should be made to prevent the plants bolting to seed. Broccoli cannot be shipped unless body-iced, but a good local market exists.

Cabbage.—Twenty-four samples tested. Early Jersey Wakefield is an early variety, and Allhead Early and Succession are medium early varieties recommended for the local market. Golden Acre, a very early round-headed variety, promises to be highly suitable for the local market. Charleston Wakefield is recommended in place of Early Jersey Wakefield for the Canadian market. The small area available at the Station for vegetable planting makes it difficult to rotate cabbage sufficiently to control black rot. In addition to loss from this cause, damage was done by worms.

Cabbage, Chinese.—Seven samples tested. This relatively new vegetable is well adapted to local conditions, and finds a ready sale. Chi-Hi-Li appears to be superior to P'Tsai and Wong Bok which have been longer under test. The newer variety heads more freely, is more compact and the heart is better blanched. New Joy is another variety which is recommended, though it does not head compactly.

Carrots.—Twenty-four samples tested. Chantenay was formerly recommended as suitable for the New York market, and the Aggeler and Musser Seed Company's strain was found to be very uniform over a period of years. Danvers is considered to be better adapted to the requirements of the Maritime markets as a loose carrot, but is not suitable as a bunched carrot for Upper Canada. Dreer's Perfect Forcing (apparently an improved strain of Amsterdam) has given good results over a period of three years, and is recommended for exclusive export to Canada.

Cauliflower.—Ten samples tested. Results from cauliflower were poor. Dry Weather and Early Snowball are recommended varieties.

Kale.—Seven samples tested. Of the Couve Tronchuda group, there appears to be no better strain than that from the Azores. Moss Curled and Half Tall Scotch are recommended in the Scotch kales or borecoles.

Kohl rabi.—Eight samples tested. Early White and Purple Vienna, if the latter is acceptable to the market, are both recommended. Kohl rabi should be reaped when quite tender and small.

Lettuce, Cabbage.—Twenty-five samples tested. Big Boston is recommended for the local market. Mignonette is a small variety suitable for home gardens. Iceberg is recommended for the Canadian market, but must be shipped body-iced. As it requires more moisture than some other varieties, trial plantings in pond land are recommended. Boston Market is a type of Tennisball which appears to be very good.

Drop wilt is a very persistent soil disease of lettuce which gives much trouble in the Station plots.

NOTE.—The cultivation of Cos lettuce for the Canadian market is not recommended.

Parsley.—Eleven samples tested. Tests of this vegetable will be reduced in future, for any double-curled or moss-curled variety is suitable for export to Canada.

Spinach, New Zealand.—Five samples tested. The seed is frequently of low germination, and the purchase of the current year's seed is recommended. Soaking the seed is an help to germination.

Swede or **Ruta Baga.**—Six samples tested. Burpee's Golden Neckless is strongly recommended. It is early, smooth, almost neckless, and stands drought. Ruta baga seed should be sown directly in the field and thinned, and not transplanted from seed beds.

Tomato.—Nineteen samples tested. The principal test was an early one. Seed was sown on 19th August, 1929, and the seedlings transplanted on 10th October. The first picking was made on 30th November and continued till 11th January. Further pickings would have been made (and larger yields secured) had not thieves stolen fruit and injured the vines late in January; a loss of at least 10 per cent of the fruit was estimated.

The plants were pruned and grown to stakes placed at three different distances, 12 inches by 12 inches by 30 inches, 12 inches by 18 inches, by 30 inches, and 12 inches by 24 inches by 30 inches. The second-named distance gave the highest yields per acre. A wider distance than this is recommended for farm practice. See later paragraph.

In the three plots Dreer's Bonny Best gave the highest yield, 1.04 lbs., 1.9 lbs. and 1.7 lbs. respectively per plant. The average of these, 1.5 lbs. per plant represents a yield of 9½ Bermuda tomato crates per rod or 544 bushels (56 lbs.) per acre.

Labour may be saved by dispensing with the pricking out of plants, and setting spindly plants deeply, that is, up to the first strong leaf. Crowding of plants in seed-beds makes more difficult the control of blight. Frequent dusting or spraying throughout the growing season is necessary to control blight and other diseases and pests.

Pruning and staking appear necessary for the production of early fruit. Plants from seed sown in August should be bearing in late November and should continue to bear till February. Seed sown later, from October to November, produce plants which fruit lightly. Later sowings should bear heavily, and there is less need to stake the late crop.

A distance recommended for farm planting staked tomatoes is as follows: double rows 20 inches apart and each pair of rows 36 inches apart; plants set 20 inches apart in the rows and opposite each other. The advantages of growing pruned vines to stakes are (1) earliness of fruit, (2) little insect injury, (3) uniformity of fruit, subject to varietal characteristics, (4) high yield per acre, and (5) ease of cultivating, dusting or spraying and picking. The disadvantages, as compared with growing on bushes or on the earth, are (1) greater labour in caring for the plants, but this is mitigated by the closer planting permitted by this method, and (2) the cost and care of stakes.

Other Vegetables grown in 1930 or other years. Birdeye Peas (or Beans) are strongly recommended for summer cultivation. Fava or Portuguese Beans, seed from Azores, are recommended as being more prolific than English Windsors. Soy Beans are of excellent flavour, but difficult to shell when green. Brussels Sprouts, as a rule, crop lightly. Green Glazed Cabbage is an excellent summer greens, but the seed is difficult to obtain. Red and Savoy Cabbage give good results. Cardoon and Globe Artichokes grow readily, but bear shyly. Celeriac was a failure. Chard (Swiss) is easy to grow, but is a popular host-plant of fire-worms. Collards, Corn Salad and like greens are not recommended. Sweet Corn; Golden Bantam is strongly recommended, but must be heavily manured.

Cucumber; Windermere Wonder is a long, dark green variety, but does not bear as heavily as White Spine. Egg Plant; Black Beauty is recommended. Endive is easy to grow, but is susceptible to disease. Finocchio or Florence Fennel is a new vegetable of easy culture. Leeks are as easily grown as onions, but the seed often germinates badly. Mustards are popular in the local market. Okra or Gumbo is a summer vegetable of easy culture. Parsnips; Hollow Crown is recommended. Peas; dwarf varieties are recommended to the home gardener. Pepper, Sweet; Bull Nose is recommended. Pumpkin; selected local seed is preferable to imported seed, but of the latter Green Striped Cushaw is one of the best; some good pumpkin seeds are brought from the Azores. Radish is of very easy culture. Salsify or Oyster Plant should be more generally planted, as it is of milder flavour than parsnip. Squash; White Bush is recommended for early crop, and Hubbard for main crop. Turnip; any white-fleshed variety is recommended.

Christophine, Chayote or Choco can be planted to grow over bank, fence or trellis. Some years ago Roselle or Jamaica Sorrel was successfully grown; the flowers and surrounding bracts make a good preserve. In January roots of Sweet Cassava were brought from Trinidad; the plants are thriving. Several species of Yams were brought from Montserrat, but have not done well. Large-fruited Papaws were brought from Trinidad and St. Lucia for seed; the papaw should be found in every garden.

Potato Tests.—These were largely a continuation of tests of previous years. Samples of potatoes imported commercially and samples imported experimentally by the Department were planted chiefly to observe the percentages of leaf-roll and mosaic present. Treatments to hasten germination were continued under the direction of Dr. F. E. Denny of the Boyce Thompson Institute for Plant Research, Yonkers, N.Y.

Virus Diseases.—Bermuda seed, i.e., seed planted the second generation in Bermuda was remarkably free. The main crop of Triumphs grown from Long Island Nebraska seed averaged 2.14 leaf roll, and seed imported direct from Nebraska was clean. A few strains of Garnets from Nova Scotia were very badly infested, as high as 50 per cent in a few cases; the Station plots (from seven growers) and the greater part of the crop throughout the Colony contained from 1 to 10 per cent. The presence of high percentages of leaf-roll in a part of the crop was reported to the District Inspector in Nova Scotia, who saw that better strains were substituted for the next season. Mosaic is rare in this variety. Prince Edward Island Garnets were almost free from leaf-roll.

Late Blight.—The early planting of Bermuda-grown seed, and the main planting of Triumphs were kept free from blight. When the Garnet plots had been planted 74 days a slight infestation was observed, but was kept under control, and when the crop was dug at 110 days about 30 per cent of the plants carried green leaves. Practically no blight infested tubers were found.

The above is not written in defence of spraying or dusting as a cure, but to illustrate that blight in Garnets can be kept in check after it has appeared.

Yields of the two principal crops were as follows:

Triumphs, 66 lbs. (about $\frac{2}{5}$ bbl.) per rod or 176 bushels per acre.

Garnets, 110 lbs. (about $\frac{3}{4}$ bbl.) per rod or 293 bushels per acre.

These yields are extremely small if compared with potato yields outside of Bermuda, yet are above the average yields in the Colony. Yields

from Prince Edward Island Garnets were 2½ per cent higher than yields from Nova Scotia Garnets.

Tests to Hasten Germination.—The seed for this test was from Nebraska, furnished by the College of Agriculture, and from Long Island, grown from Nebraska stock. Treatments were made with various strengths of ethylene chlorhydrin; rows of untreated seed were planted as checks. The seed was planted from 24th to 28th September, and because of the lateness of planting, error in technique or other cause, no advantage was obtained from the treatments, which was contrary to the results secured in other years.

Tests for New York College of Agriculture.—The Department planted for the New York College of Agriculture samples of certified seed which were treated with various chemicals and planted in Bermuda with the object of securing early readings of virus and other diseases.

Onion Tests.—Six samples were tested. The principal work with onions since 1925 has been the selection of an early high-yielding strain. The selected bulbs have been sent to the Aggeler and Musser Seed Company, Los Angeles, California, and the seed grown from them has been returned to Bermuda to be planted, and from the resulting crop a further selection has been made; this has continued from year to year. Samples of the seed distributed to growers was considered by some to be the best seed they had ever planted, and excellent yields were obtained.

Lily Bulbs.—See Plant Pathologist's report.

Fruit.—See Horticulturist's report. It is desirable that a small but systematically laid out orchard of miscellaneous fruit should be established at the Station. The Department imported forty-one citrus and other fruit trees for various persons.

Leguminous Green Manures.—As is customary, most of the experimental plots were planted to soy beans. Sown late in June, fair yields were obtained, and were plowed under in August.

Purchase of Agricultural Machinery Recommended.—Expenditure on machinery would not only effect savings in Station expenditure, but should prove of benefit to farmers because of the experience gained in the general suitability or otherwise of the machinery tested. A mechanically-drawn plow and a 2-ton truck are suggested as the first purchases. The sum of £155. 9. 0. was spent for carting and plowing; the cost of the first included cartage to and from the Station.

Flower Beds, etc.—See Horticulturist's report.

Live Stock.—The Station live stock consisted at the beginning of the year of the following Guernsey cattle:

Montrose Hector (143022), born 24th January, 1927; sire, Albamont Argonaut; dam, Dora of Atwood's Dairy.

Montrose Hercules (173171), born 9th September, 1929; sire, Montrose Hector; dam, Albamont Juliet.

Albamont Juliet (85736), imported; born 20th April, 1918; sire, Deanie's May King; dam, Juliana of Gerar.

Juliana of Montrose (203737), born 1st November, 1925; sire, Montrose Sovereign; dam, Albamont Juliet.

Julia of Montrose, born 6th January, 1928; sire, Uncle Sam of Somerville; dam, Juliana of Montrose.

Joan of Montrose (281658), born 13th April, 1929; sire, Montrose Hector; dam, Juliana of Montrose

During the year the following animals were added to the herd:

Colchester King (7456), born 18th April, 1929; sire, Lindy's Slogan; dam, Daisy of Hillcrest. (Purchased from A. N. Faulkner, Great Village, N.S., on 21st January.)

Canadian June (5108), (330802) born 8th June, 1926; sire, Blanche's Raider of Nappan; dam, Canadian Spring. (Purchased from A. N. Faulkner, Great Village, N.S., on 21st January.)

The following animals were born during the year:

Montrose Tom (8505), born at Agricultural Station 14th February; sire, Slogan's Prince; dam, Canadian June; bred by A. N. Faulkner, Great Village, N.S.

Joy of Montrose, born 8th March; sire, Montrose Hector; dam, Juliana of Montrose.

Montrose Ajax, born 20th March; sire, Montrose Hector; dam, Julia of Montrose.

Montrose Castor (186160), born 22nd October; sire, Montrose Hector; dam, Albamont Juliet.

The following animals were sold for breeding purposes to approved purchasers:

Juliana to Mr. W. R. Evans, Pembroke.

Julia to Mr. B. C. C. Outerbridge, Smiths.

Joan to Mr. F. A. Hollis, Pembroke.

Hercules to Mr. H. Bierman, Devonshire.

Montrose Tom to Mr. J. R. Finlay, Sandys.

Ajax to Mr. Jas. H. Hollis, Hamilton Parish.

In January a Saanen doe, Gertie, was bought from the Government Farm, Trinidad.

Pigs and poultry were not included in the Station live stock during the year.

Poultry breeding stock was imported for a few poultrymen, and assistance was given in the treatment of poultry diseases.

Disposal of Produce.—See Appendix F.

Repairs and Additions to Buildings, etc.—A tomato packing shed, 120 feet long and 20 feet wide, with galvanised roof and sides and concrete floor was built. A Cutler grader, gravity conveyors and other machinery were set up. An onion and potato grader was set up in a room temporarily prepared for it. The Farmers' Market was renovated. A carpenters' bench was built in the tool barn. Guttering, 232 feet, was placed on the Exhibition stables. Exhibition pig pens were built. Sashes in the Exhibition poultry building were fitted with new hinges. Woodwork of most of the Exhibition buildings was painted. Tools and implements were repaired.

The Department of Public Works painted the exterior wood-work and part of the interior wood-work of the Director's quarters, built a fireplace and installed a pressure pump. On 13th August the Department surveyed the south-west boundary and set down boundary stones.

Cattle stables, feed room, additional tankage and store rooms are needed, also repairs to the glasshouses and re-surfacing of some of the drives. More buildings and other accommodation are required for Exhibition purposes, and additions to offices.

Prison Labour.—Prison labour totalled 412 man-days, and was employed in excavating, grading, lime-washing, and preparing the grounds for the Exhibition and putting away material at its close. The cost to the Department was £11. 14. 0. The labour party consisted of four men in charge of one warden.

Office Work.—The routine work of the office was satisfactorily performed. During the year 2,337 letters were dispatched and 1,704 received. Copy was prepared for Agricultural Bulletin, 5,000 words per month; there is evidence that the information contained in the Bulletin is appreciated by some of its readers. Statistics were compiled for various publications, including Annual Report, Blue Book, Year Book, and for Institut International d'Agriculture, Rome. The preparation of certificates covering exports of lily bulbs occupied considerable time. The clerical work and accounting connected with the Exhibition was performed by the office staff assisted by temporary clerks, costing £46. 4. 6. Other office work is referred to elsewhere in this report.

Publications Received and Issued.—Acknowledgment is gratefully made of the numerous valuable publications received from many agricultural and other scientific institutions. Full advantage cannot be taken of these additions to the Station library until indexed, and it has been found impracticable to do this up to the present time.

The publications of the Department were restricted to 600 monthly copies of the Agricultural Bulletin, 700 copies of the Exhibition catalogue, 500 copies of the Annual Report, 5,000 leaflets containing marketing information, 1,000 leaflets "What to Plant Next Season", and several hundred mimeographed seed lists. Frequent articles were sent to the local press.

Visitors.—Distinguished visitors to the Station were His Excellency the Governor-General of Canada and Lady Willingdon, His Excellency the late Governor of Bermuda and Lady Bols, His Excellency the Acting Governor of Bermuda and Mrs. Evans; Honourable Mr. Mackenzie King, Premier of Canada; Honourable W. R. Motherwell, Canadian Minister of Agriculture; Honourable E. C. Eliot, Administrator of Dominica; Dr. J. A. Reddick, Canadian Commissioner of Dairying; Honourable H. J. Pink, Treasurer of St. Lucia; Mr. Frederic Hudd and Mr. F. W. Frazer, Canadian Trade Commissioners; Mr. G. Evans, Principal of Imperial College of Tropical Agriculture, Trinidad; Mr. H. C. Sampson, Economic Botanist, Royal Botanic Garden, Kew; Mr. J. A. McBride, President, Eastern Canada Fruit and Vegetable Jobbers' Association; Mr. F. E. Holloway, Supervisor, Mutual Brokers, Montreal; Mr. F. L. Fuller, Department of Natural Resources, Nova Scotia.

Mr. Evans and Mr. Sampson addressed the Board. Mr. McBride and Mr. Holloway addressed Board and farmers. Mr. Fuller judged cattle and horses at the Annual Exhibition.

Rainfall.—Record of rainfall will be found in Appendix A.

BERMUDA AGRICULTURE IN 1930

The year under report was one of local agricultural depression. Weather conditions, particularly towards the end of the season, were unfavourable and reduced yields. Exports to Canada increased 60 per cent over those of the previous year, but the increase did not compensate for the reductions in exports to New York.

The quantities of vegetables exported during the last ten years were as follows:

1921	470,225	bushels
1922	379,082	"
1923	318,761	"
1924	416,604	"
1925	313,280	"
1926	426,896	"
1927	371,887	"
1928	420,802	"
1929	333,132	"
1930	244,589	"

The quantity of vegetables exported in 1930 was 73 per cent of the previous year's exports, and 62 per cent of the average of the last ten years.

The **gross** or sales price of agricultural exports (exclusive of lily buds) was as follows:

To The United States of America

Beets, 83 crates @ $1.20	$ 100	
Carrots, bunched, 234 crates @ $1.00	234	
Carrots, loose, 2,111 crates @ $1.25	3,639	
Celery, 47,989 crates @ $3.16	151,645	
Kale, 4,740 crates @ $3.75	17,775	
Lettuce, 24 crates @ $1.25	30	
Onions, 148 crates @ $1.56	251	
Parsley, 11,431 crates @ $3.39	39,751	
Potatoes, 24,558 barrels @ $8.75	214,883	
Turnips, 164 crates @ $1.25	205	
Miscellaneous vegetables, 472 crates @ $1.25	590	
Lily bulbs, 4,719 cases @ $20.00	94,380	
	$523,483	=£109,059

To Dominion of Canada

Beets, 388 crates @ $1.40	$ 543	
Cabbage, 687 crates @ $3.37	2,315	
Carrots, 16,841 crates @ $1.39	23,240	
Celery, 8,551 crates @ $2.84	24,285	
Onions, 10,322 crates @ $1.12	11,560	
Potatoes, 452 crates @ $1.97	890	
Tomatoes, 19,743 crates @ $1.19	23,594	
Miscellaneous vegetables, 122 crates @ $1.00	122	
Lily bulbs, 286 cases @ $20.00	5,720	
	$ 92,269	=£ 19,222

To Great Britain

Lily bulbs, 430 cases @ £3. 10. 0		£ 1,505

To British West Indies

Beets, 18 crates @ 2/9	£ 3	
Carrots, 70 crates @ 2/10	10	
Onions, 467 crates @ 2/6	58	
Potatoes, 5 barrels @ 18/-	4	£ 75

To Other Countries

Lily bulbs, 73 cases @ $20.00	$ 1,460	=£ 304
Total		£130,165

The estimated **local** value of all agricultural products (exclusive of flowers) is given below:

Exported.

To United States of America	£ 87,152	
To Dominion of Canada	15,392	
To Great Britain	1,165	
To British West Indies	229	
To Other Countries	62	£104,000

Consumed Locally

Potatoes and other vegetables	£ 55,700	
Bananas	25,000	
Milk	91,000	
Eggs	24,000	
Meat	15,350	211,050
Total		£315,050

The above estimate of the exported crop is 97 per cent of that of the previous year, and 83 per cent of the average of the previous five years.

Below are given the estimated local values of agricultural produce (exclusive of flowers) in the last seven years.

	Exported	Consumed locally	Total
1924	£192,000	£174,000	£366,000
1925	104,500	166,000	270,500
1926	190,500	185,000	375,500
1927	133,000	191,000	324,000
1928	92,000	190,000	282,000
1929	106,400	191,200	297,600
1930	104,000	211,050	315,000

Average New York prices in 1913 (basic pre-War year) and in the last five years were as follows:

	1913	1926	1927	1928	1929	1930
Beets	$ .97	$ 1.68	$ 1.16	$ 1.14	$ 1.04	$ 1.20
Carrots	.95	1.70	1.50	1.40	1.46	1.22
Celery	3.40	8.24	5.32	?	3.39	3.16
Onions	1.53	1.95	2.52	2.00	1.91	1.56
Parsley	1.07	1.95	1.56	1.40	.92	3.39
Potatoes	5.97	14.75	10.31	9.25	8.29	8.75

It is not possible to present with as equal a degree of accuracy the prices obtained in Canada during the periods named above. A comparison follows of Bermuda farm prices for vegetables sold in New York and Canada in 1930.

	Sold in New York	Sold in Canada
Beets	2/5	3/9
Cabbage	—	9/–
Carrots, bunched	1/8	—
Carrots, loose	2/5½	3/8½
Celery	6/6	8/3
Onions	2/11	3/6
Parsley	8/6	—
Potatoes, barrel	24/9	—
Potatoes, crate	9/3	5/3½
Tomatoes	—	4/–

Agricultural exports (exclusive of lily buds) were divided among our four markets as follows:

	1929	1930
United States of America	89.25 per cent	83.8 per cent
Dominion of Canada	10.00 " "	14.8 " "
British West Indies	0.50 " "	0.06 " "
Great Britain	0.25 " "	1.12 " "
Other countries	— " "	0.22 " "

MAJOR CROPS

Potatoes.—Exports for the last ten years were as follows:

1921	157,213 bushels
1922	111,997 "
1923	89,611 "
1924	93,011 "
1925	67,635 "
1926	91,933 "
1927	96,192 "
1928	110,136 "
1929	97,874 "
1930	55,953 "

The quantity exported in 1930 was 57 per cent of the quantity exported in 1929, and 52 per cent of the average of the previous ten years. It is again pointed out that a larger proportion of the crop is now consumed locally than formerly.

Prices in New York showed a slight improvement on the previous year's prices, as shown below:

1926	1927	1928	1929	1930
$14.75	10.31	9.25	8.25	8.75

Triumph seed imported direct from Nebraska and that grown one season in Long Island, N.Y., from Nebraska stock gave satisfaction. The Long Island seed was inspected for the Department by Dr. S. E. A. McCallan, who reported, "The potatoes were in excellent condition as regards freedom from disease and for vigor. . . . . The weakest feature of the seed production in Long Island this year is the lack of isolation from other potatoes." The last-named feature was brought to the attention of the contractor, and conditions in this respect were much better the following season. Seed from other sources was accepted on presentation of certificates.

Onions.—Exports of onions during the last ten years were as follows:

1921	49,455 bushels
1922	70,874 "
1923	35,176 "
1924	41,170 "
1925	21,170 "
1926	39,336 "
1927	19,930 "
1928	16,063 "
1929	4,055 "
1930	10,937 "

The quantity exported in 1930 was 243 per cent of the quantity exported in 1929 and 26 per cent of the average of the last ten years. Onion exports were highest during the ten years ended 1900 when a yearly

average of 315,715 bushels was reached; the quantity exported in 1930 was but 3½ per cent of this quantity.

Reference is made under "Agricultural Station" to the selection of onion seed.

Sales of onions may be increased in Canada if the necessary care is taken in grading and packing, but farmers are not agreed regarding the profits from this crop under present day conditions.

Other Vegetables.—Exports of vegetables, other than onions and potatoes, for the last ten years were as follows:

1921	263,649	bushels
1922	191,806	"
1923	193,974	"
1924	280,745	"
1925	216,891	"
1926	284,135	"
1927	255,765	"
1928	294,623	"
1929	232,202	"
1930	167,788	"

The quantity exported in 1930 was 73 per cent of the quantity exported in 1929 and 68 per cent of the average of the last ten years.

Until recent years celery, carrots, parsley and beets have been the most important vegetable exports. From 1920 onward the largest annual shipments of these vegetables were: Celery, 155,894 bushels; carrots, 115,143 bushels; parsley, 90,285 bushels, and beets, 35,123 bushels. With the shift from New York to Canada the most important vegetables are now likely to be (exclusive of onions and potatoes) carrots, tomatoes, celery and cabbage in the order named.

Bermuda Easter Lilies (*L. longiflorum,* **var.** *eximium.* **Trade name,** *L. Harrisii*). Reference is made in the report of the Plant Pathologist and elsewhere of the two field inspections which were undertaken this year. This action on the part of the Department, at the request of some of the leading growers, was a pronounced benefit to the growers.

Exports of bulbs during the last ten years were as follows:

1921	936	cases
1922	1,604	"
1923	3,116	"
1924	3,539	"
1925	4,040	"
1926	4,524	"
1927	6,043	"
1928	7,611	"
1929	5,864	"
1930	5,508	"

The quantity exported in 1930 was 94 per cent of the quantity exported in 1929, and 145 per cent of the average of the last ten years.

The Department spent £143. 2. 10. to further the sale of bulbs in Great Britain. Presentation cases were sent by the Department to His Majesty the King, London Park Commissioner, and Royal Botanic Gardens, Kew. Bulbs were sent to Messrs. James Carter and Company for exhibit at the Royal Horticultural Society's Show, and at Ideal Homes Exhibition (London); ninety-eight exhibition plants were produced from one hundred bulbs. Considerable publicity was given these exhibits. Mr. Malcolm Hollis contributed four cases of bulbs.

Some complaint is still received regarding the lack of texture in Harrisii flowers, and it is hoped that a seedling developed by Mr. H. E. D. Smith may meet the demand for a flower of firmer texture.

The Department endeavoured unsuccessfully to secure co-operative action from the growers with respect to prices of bulbs offered for sale in Great Britain. In the end the matter was left to the judgment of Messrs. Robert Tucker and Company, the Board's London representative, and the growers who planned to ship to Great Britain, and prices more or less satisfactory to all interested were eventually arrived at.

Bermuda lily growers are under obligation to Messrs. Tucker for their untiring zeal in extending the sale of bulbs; to Mr. S. G. Tallents, Secretary of the Empire Marketing Board, for the publicity given to Bermuda bulbs and other assistance afforded, and Mr. F. H. Burn, the Trade Development Board's London representative, who first suggested advertising through the horticultural societies, and who has given considerable help in the matter.

Messrs. Tucker's report will be found as Appendix B.

MINOR CROPS

Fodder Crops.—Corn or maize is grown by a few dairymen as a silage crop; it is more generally grown as a soiling crop and for its grain for pig feed, but the total acreage is small. Carrots and a few other roots are grown in a small way for fodder. Unsaleable potatoes, both sweet and Irish, and roots are fed to stock.

Green Manure Crops.—Green manure crops are grown by very few, though soy beans and cowpeas can be grown in the summer on land which would otherwise be idle. Their cultivation does not interfere with cash crops.

Fruit.—It is estimated that 90 acres were under bananas *(M. Cavendishii)* which produced 81,000 bunches. The cultivation of strawberries is increasing, but most growers fail to carry their plants through the summer, and new plants are imported in the autumn. See report of Horticulturist.

Flowers.—Flower culture is becoming increasingly important, for the growing number of tourists who visit Bermuda create a demand. The Department has no record of the number of lily buds exported.

RECOMMENDATIONS REGARDING IMPORT DUTIES ON VEGETABLES

The Board recommended that the high specific duties on arrowroot starch and Swede turnips should be removed, and that all vegetables which bear high specific seasonal duties during periods of the year should be admitted free of duty during the periods of the year when the specific duties are not in effect. Only the recommendation respecting arrowroot starch was acted on.

HORTICULTURE

See Horticulturist's report.

The growing importance of the tourist trade and the greater attention given by land owners to the care of their grounds are increasing the calls made on the Department for advice, plants and other assistance.

The planting of trees by the roadsides, as pointed out by the Horticulturist, and more particularly the care of nurseries for the propagation of plants for this purpose properly belong to this Department. The care of Colonial grounds is obviously another duty which should be allocated to this Department.

At the Somerset Flower Show, held on 8th May, specimens of recently introduced flowering plants were exhibited.

The float of the Department in the Floral Pageant held on 26th April was largely the work of the Horticulturist. The Director acted as a judge and in other capacities in connection with the Pageant.

CONTROL OF PLANT DISEASES AND PESTS

See Plant Pathologist's report.

The two "Friend" motor sprayers were rented at twenty shillings per day each; the rate included attendant, petrol and lubricants. They were in use as follows:

St. Georges	2½	days
Hamilton	10½	"
Smiths	3	"
Devonshire	14½	"
Pembroke	2½	"
Paget	16	"
Warwick	5½	"
Southampton	8	"
Sandys	1½	"
Total	64	days

A supply of fungicides and insecticides was kept at the Station, and small quantities were often given to farmers and gardeners when not procurable elsewhere. Oil emulsion was made for distribution. Tests were made with Sprayfix, a new sticker which promises to be a good one.

INSPECTION AND REGULATORY SERVICES

The Agriculture Act, No. 22 of 1930, came into force on 15th May.

On 9th November the Board made Bylaws, under the provisions of the Boards Act, 1922, dealing with the control of infectious animal diseases. Inspection and other regulatory services continued to be administered under Acts repealed by Act 22 of 1930.

The following matters are dealt with by Bylaws or Regulations:

(1) Contagious Animal Diseases.—All imported domestic animals should be accompanied by certificates of health, and in some cases that they are from areas free from certain contagious diseases. Premises used for the keeping or slaughter of animals and the storage or sale of animal carcases are subject to inspection. The enforcement of the Bylaws are with the Government Veterinary Officer, who has authority to take such measures to control outbreaks of contagious diseases as he shall deem expedient and which are not inconsistent with the Bylaws. Owners of animals and veterinarians are required to report cases of contagious diseases.

During the year two cows were found to be affected with tuberculosis, and were slaughtered. Compensation amounting to fourteen pounds was paid to the owners.

(2) Produce Exported.—See report of Inspector of Produce. All produce is subject to inspection immediately previous to shipment. It is anticipated that this form of inspection will be superceded by central packing under Government supervision.

The following persons and firms were licensed to export produce during the year under report:

Benevides and Rego, Hamilton.
Bermuda Green Vegetable Growers' Association, Hamilton.
J. M. Darrell, Smiths.
The Hill Company, Hamilton.
O. R. Loblein, Hamilton.
Pearman, Watlington and Company, Hamilton.
J. Perry and Sons, Hamilton.
Stella Benevides, Paget (kale only.)
W. A. Young, Pembroke (to New York only.)

FARMERS' LICENSE.

E. J. Moniz, Devonshire.

The E. W. Outerbridge Company, Hamilton.

Material imported to be used as crates for export vegetables is subject to inspection at the time of importation.

(3) Seed Potatoes.—See report of Inspector of Produce. Importers of seed potatoes should notify the Director of intention to import, and should satisfy the Director regarding the nature of the seed it is proposed to import. Only certified seed of approved strains may be imported.

(4) Control of Plant Diseases and Pests.—See report of Plant Pathologist. The Board has power to prohibit both the importation and exportation of plants within the meaning of the Act. All plants imported are subject to inspection. The Plant Pathologist is the officer responsible for the proper execution of the Bylaws governing the control of plant diseases and pests.

The importation of the following plants is prohibited:

(a) Banana plants and parts thereof, except fruit.

(b) Antirrhinum or snapdragon plants.

(c) Citrus plants and citrus fruits (unless the latter are free from leaves and portions of the plants) imported from the West Indies and the Bahamas.

(d) Irish potatoes from Great Britain and Ireland, Europe, Newfoundland, St. Pierre and Miquelon, and Garnet and Triumph potatoes from all sources unless conforming to seed potato regulations.

(e) Sweet potatoes from the United States of America, Cuba, the Bahamas, British Guiana, Jamaica, the Canal Zone and Porto Rico.

(f) Carrots in their raw or untreated state.

(g) All bulbs belonging to the genera Lilium and Narcissus.

(h) Indian corn or maize in the ear, broom corn and other sorghums, and sugar cane in the raw or untreated state.

(5) Inspection of Nursery Stock.—All nursery stock to be exported is subject to inspection, and should be certified by the Department.

Bermuda Easter lilies are examined at least twice in the field and once at the packing shed.

The following persons and firms were licensed to export lily bulbs:

Henry and Lee, New York and Hamilton.
Malcolm Hollis, Harrington Sound.
T. A. Hollis, Crawl.
The E. W. Outerbridge Company, Hamilton.
Theodore Outerbridge, Hamilton.
H. E. D. Smith, St. Davids.
Stephens Bros., Paget.

(6) Vegetable Seeds Imported for Sale.—See "Vegetable Tests, Agricultural Station." Seeds of some vegetables are subject to test for viability, trueness to type and suitability for local cultivation. Celery seed is usually tested for presence of blight postules. Some vegetables are restricted to one variety of each.

The following persons and firms were registered as vendors of seed:

Bermuda Green Vegetable Growers' Association, Hamilton.
Henry Dunkley and Son, Hamilton.
The Hill Company, Hamilton.
O. R. Loblein, Hamilton.
The E. W. Outerbridge Company, Hamilton.
J. H. P. Patterson, Somerset.
T. J. Wadson and Son, Hamilton.

NOTES ON MARKETING

More time and thought were given by the Board and Department to the marketing of Bermuda vegetables in Canada than to anything else. No less than forty-four meetings of the Board and committees of the Board were held, and at all some aspect of marketing in Canada was discussed.

Growth of Exports to Canada.—Despite unfavourable weather conditions and declining local agriculture, exports of vegetables to Canada were 160 per cent of the exports of the previous year, as already noted.

Surveys of Canadian Market.—The Director made a brief survey of marketing conditions in Eastern Canada. The subject is referred to under "Director's Visits Abroad". Mr. T. Arthur Hollis, Assistant Inspector, made two visits to Montreal. His reports contained useful information.

Visits of Canadians to Bermuda.—Reference has already been made to the number of influential Canadians who visited the Station during the year. These visits showed an increased interest in the Colony and its products.

Free Admission of Bermuda Vegetables into Canada.—Changes in the Canadian tariff which admit Bermuda vegetables free of duty were made too late to be of great benefit to the Colony in the season of 1930, but should prove to be of immense advantage in the future.

Central Packing.—The erection at the Station of a tomato packing house was first discussed by the Board in July, 1929. In that year no building was undertaken because of lack of funds, but late in the shipping season of 1930 the house was sufficiently near completion to be put to use,

and two shipments of tomatoes were made from it. Additions were made during the summer of 1930, and at the close of the year a house 120 feet long and 20 feet wide was completed. The machinery installed is a 24-bin motor-driven Cutler grader. Gravity conveyors are used to move the empty and filled crates.

Towards the end of the year a motor-driven Boggs onion and potato grader was set up in temporary quarters.

Labels, wrappers, liners and crates were purchased.

As already stated, it is anticipated that central packing under Government supervision will ultimately supercede inspection at the dock. Too few farmers and shippers are aware of the necessity to improve the grading and packing of export vegetables. The situation is an old one, for the Bermuda Almanack for 1879 refers to the poor grading of tomatoes, then exported to New York,

> "There were a great many put up this season with some good
> "fruit to line the box and all the trash in the middle. . . . . .
> "The worst of it is that a few hundred boxes of poor tomatoes
> "in a cargo will damage the sale of the whole, but you cannot
> "make the people generally see this."

Nor in 1930.

Colonial Mark.—The Colonial Mark, which consists of a conventionalised pink oleander flower and the words, in green, "Bermuda Brand" and "Winter-grown", was registered in Canada on 8th July and in Bermuda on 6th October. The use of the Mark is restricted to Government-packed vegetables.

New Types of Crates.—The quality of the crate material imported showed some improvement as the year progressed, but there remained much room for further improvement.

The new "standard" bushel crate was favourably received in Canada from the first, and is a suitable container for beets, carrots, cucumbers, onions, parsley and potatoes. The choice of a suitable container for tomatoes was not as fortunate, and it was not until three types had been tried out that a suitable one was found. The crate in use is a 20-lb. lug very much like the British Columbia lug. It is popular with Canadian buyers, and satisfactory in all respects.

More attention is being given to crates, for it is now realised by most that the container helps to sell its contents. The standardisation and co-operative purchase of crates by the Conference Colonies was discussed at the Agricultural Conference held in the Imperial College of Tropical Agriculture, Trinidad, in January; and some progress was subsequently made. Samples and quotations were received from several Canadian manufacturers, and the information was made known to importers. The orderly importation of crates and their storage under proper conditions was considered by the Board. Enquiries were made regarding the purchase of crate material in Sweden.

Advertising in Canada.—In 1930 Bermuda had not reached the place where much advertising could be profitable, and little money was spent. Two advertisements were published in a special issue of the Montreal Star and one in the Convention programme of the Eastern Canada Fruit and Vegetable Jobbers' Association. In addition several articles were written for the Star, Halifax Chronicle and other publications. Four thousand circulars were distributed in Eastern Canada.

Convention of Vegetable Jobbers.—Late in the year an invitation was accepted for a representative of the Department to attend the Sixth Convention of the Eastern Canada Fruit and Vegetable Jobbers' Association to be held in Saint John on 7th, 8th and 9th January, 1931.

Sale of Bulbs.—See "Bermuda Easter Lilies" on a previous page.

Orderly Marketing of Vegetables in Canada.—Through the frequent meetings of the Board and licensed shippers a better understanding was brought about, and progress was made in orderly thinking about orderly marketing.

At a joint meeting of the Board and shippers held on 19th December a majority of the shippers decided that sales should be through one representative broker in each of the key markets of Halifax, Saint John and Montreal. The shippers arrived at a majority decision regarding the selection of a brokerage firm in each of two markets, and tied in their selection of the third broker. In the latter case only was the decision of the meeting influenced by the votes of members of the Board who were not shippers. The form of sale decided on can be terminated by a majority vote.

Instructions to Farmers.—The Department gave to farmers the information it had regarding growing vegetables for the Canadian market.

Farmers' meetings were held in Southampton, Warwick, Paget, Smiths and Hamilton Parishes. Information regarding what to plant was published in the Bulletin, in the local newspapers and as a circular (1,000 copies). Prices at which Bermuda vegetables had sold and other information regarding the Canadian market were published. Farmers were invited to visit the Station, and frequent visits to farms were paid by members of the Department.

Distribution of Seed and Seedlings.—Vegetable seed was distributed free of cost, and vegetable seedlings were sold at nominal prices.

Weekly Steamship Service to Canada.—A weekly service throughout the shipping season is necessary. The Board made representation on the subject, both direct and through the Trade Development Board.

Increase in Freight Rates to Canada.—Information having been received of the intention of the Canadian National Steamships to increase upward freight rates, Honourable J. P. Hand, Chairman of the Trade Development Board, and the Director were appointed delegates to make representation to the Canadian Government. The delegates were successful. Copy of their report is attached to Appendix C.

Shipment to Canada through American Ports.—This subject occupied the Board's attention several times during the year. Following

instructions from the Board, the Director prepared a memorandum on the subject for dispatch to Ottawa. Copy is attached as Apendix D.

New York Market.—During the last ten years vegetable exports to New York have decreased 62 per cent. It appears that early potatoes, and celery at times, are the only vegetables for which profitable prices may be expected. Occasionally, as was the case with parsley in 1930, high prices may be obtained for other vegetables because of a temporary shortage in the domestic crop.

Consideration was given to further representation at Washington regarding the duty on celery, but ultimately it was decided to take no action.

The Director made a brief survey of market conditions in New York on his return from Canada in August. New York prices for Bermuda vegetables were received from Messrs. Urner-Barry weekly during the season, and were published.

Inquiry Regarding Buenos Aires.—From time to time it has been suggested that a good market for Bermuda vegetables may exist in Buenos Aires. Inquiries made secured information to the contrary. The kinds of vegetables grown in Bermuda are grown in Argentine also, though not at the same season of the year; onions are imported from Spain and Italy; potatoes from Italy, France and United Kingdom; tomatoes from Brazil and Azores, and small quantities of miscellaneous vegetables from the neighbouring countries.

DIRECTOR'S VISITS ABROAD

The Director was absent from the Colony on official business on four occasions.

Trinidad: Agricultural Conference.—The Conference was called by the Secretary of State, and was attended by agricultural officers from Trinidad, Barbados, British Guiana, the Leeward Islands, the Windward Islands and Bermuda. Subjects on the agenda of special interest to this Colony were the Canadian fruit and vegetable trade, plant quarantines, agricultural economics and soil research. A report, dated 12th February, was presented.

Trinidad: Tariff Conference.—The Conference was called by the Governor of Trinidad to discuss subjects relating to the Canada-West Indies Trade Agreement of 1925. The Director was appointed delegate from this Colony. A confidential report, dated 12th July, was presented to the Colonial Secretary. A supplementary report, dated 17th October, was presented to the Board, and dealt with agricultural matters which had been enquired into or had come under notice.

Canada and U. S. A.: Survey of Vegetable Market, etc.—A short survey was made of market conditions in Halifax, Saint John, Montreal, Toronto and New York. Information was obtained, both in Canada and U. S. A., on other agricultural subjects. A report (46 pp.), dated 30th August, was presented.

Canada: C. N. S. Frieght Rates.—This subject has already been referred to under "Marketing Notes." (See Appendix C.) A

separate report by the Director, dated 10th December, on marketing and associated subjects was presented to the Board.

AGRICULTURAL EXHIBITION

The eleventh Annual Agricultural Exhibition was held at the Station on Tuesday, Wednesday and Thursday, 8th, 9th and 10th April. The attendance was very good, and the entries were more numerous than in any previous year.

Undoubtedly one of the most valuable results secured from the Exhibition is the community spirit which it develops. This year there was in attendance a larger number of voluntary workers than ever before, and they, by their interest and help, "made" the Exhibition. The Department is under great obligation to these public-spirited men and women without whose assistance it would be impracticable to continue the Exhibition, the Colony's most important community effort, and one that holds an unrivalled place in the life of the Colony.

Dealing with adults' exhibits in order of classification the following brief comments are made. Horses and cattle in quality were well above the exhibits of former years, and the number of cattle shown was a record. Pigs remained a weak class. Goats were in fair numbers, and included some very good animals; the effects of the Department's breeding stock is becoming more and more evident. Poultry was in reduced numbers, but of better quality than in the previous year. Rabbits showed the interest now being taken in them. Dogs included many animals of very good breeding. Vegetables were of fair quality, and though entries outnumbered those in previous years, the benches were not as well-filled as they should have been. Disappointment was caused by the flowers, due in part to unfavourable weather. Food products were, as usual, of good quality, but arts and crafts exhibits scarcely maintained their position.

Ring events of varied character took place during the three afternoons, and were both instructive and entertaining. Cattle judging by Mr. F. L. Fuller of the Nova Scotian Department of Natural Resources was of great interest and value to the dairymen present. Mr. D. J. Lambert of Rhode Island, U.S.A., again gave general satisfaction in his awards of prizes for poultry. Mr. C. P. Knight, Jr., was another "imported" judge whose work in the ring gave satisfaction.

The Exhibition has long since out-grown its buildings. Nearly all classes were crowded. Had not Dr. H. G. Harvey, Medical Superintendent of the Hospital, kindly placed Montrose House at the disposal of the Exhibition management, it would have been impossible to have housed all the exhibits. Some minor improvements were effected in the Exhibition buildings and their surroundings.

The Board granted permission to the Commission Merchants' Association and to the Electric Light, Power and Traction Company, Ltd., to erect permanent buildings on the Exhibition grounds.

The following figures show the growth of the Exhibition. In the first column of figures are the averages of the entries received at Rosebank during the years 1893 to 1903, in the second column are the entries in 1922 when the Exhibition was resumed after the Great War, and in the third and fourth columns are the entries in 1929 and 1930.

	Rosebank	Agricultural Station		
	1893–1903	1922	1929	1930
Horses	22	86	172	154
Cattle	29	46	90	116
Pigs	10	2	11	13
Goats	–	25	51	43
Rabbits	–	13	96	114
Poultry	79*	37	331	250
Dogs	49	43	104	84
Cats	21	–	–	–
Vegetables	207	88	486	527
Fruit	–	9	104	150
Flowers and plants	168†	181	1,250	1,304
Food products	85	136	957	1,130
Arts and crafts	254	297	1,651	2,086
Miscellaneous	–	7	–	–
Totals	924	970	5,303	5,971

* Including Rabbits.
† Including Fruit.

Below are given the estimated attendances during the last nine years:

1922	7,300
1923	9,400
1924	13,000
1925	12,000
1926	11,000
1927	13,000
1928	15,000
1929	14,000
1930	15,000

Financial Statement

Receipts

	1929	1930
Balance brought forward	£ – – 1	£ – 18 6
Granted by Appropriation Act	400 0 0	400 0 0
Donations for special prizes	32 13 0	8 2 6
Advertisements in catalogue and programmes	136 3 0	144 7 0
Ground rents	64 13 0	107 6 0
Entry fees	26 9 0	5 6 11
Gate receipts	409 6 11	420 18 5
Enclosure receipts	107 17 7	109 19 9
Bicycle receipts	24 13 5	31 2 2
Miscellaneous	– 4 0	– 9 0
Unpaid adult prize money	16 19 6	2 2 6
	£1,218 19 6	£1,230 12 9

Expenditure

	1929			1930		
Prizes to Agricultural Clubs	£ 167	11	2	£ 204	6	9
Prizes to adults	359	15	0	370	17	6
Special prizes	32	13	0	8	2	6
Prizes for sports	27	1	5	25	3	0
Exhibits lost	–	–	–	3	10	0
Advertising	20	2	1	11	3	4
Printing and commission on advertisements in catalogue and programmes	120	8	8	110	19	10
Stationery and other printing	55	8	8	72	6	2
Lumber	44	2	11	39	2	7
Other material	72	14	2	70	2	6
Bands and amusements	48	16	0	24	6	0
Expenses of judges	20	7	9	28	15	0
Carriages and teas	7	12	7	31	19	1
Cartage of exhibits	24	2	0	23	12	9
Labour, field	97	6	6	49	0	8
Watchmen	6	0	0	6	0	0
Gatekeepers	26	5	0	26	5	0
Checking bicycles	10	10	0	10	10	0
Checking cloaks	–	–	–	1	10	0
Clerical assistance	47	0	8	46	4	6
Depreciation, rental, etc. of W.D. stores	26	11	11	29	0	0
Lighting and telephones	3	11	6	2	17	6
Balance	1	18	6	15	8	1
	£1,218	19	6	£1,230	12	9

Liberal special prizes were generously donated to encourage competition. Below are given the donors and winners of special prizes.

Asser Challenge Cup.—Warwick Parish was the winner of the Silver Challenge Cup presented in 1927 by General Sir J. J. Asser. The Cup was held by Mr. Wallace Frith, who won the highest number of points in his parish.

Bermuda Railway Company Challenge Cup.—Mr. E. H. Barnes, Warwick, was the winner of the Silver Challenge Cup presented by the Bermuda Railway Company for the best dairy animal in the show.

Barnes Challenge Cup.—Mr. H. A. Doe, Paget, was the winner of the Silver Challenge Cup presented by Mrs. E. C. Barnes for the best Jersey in the show.

Montgomery Sears Challenge Cup.—Mr. Roy Mayor, Paget, was the winner of the Silver Challenge Cup presented by Mrs. Montgomery Sears for annuals.

No. 3 Planet Jr. Seeder.—Mr. W. A. Young, Pembroke, was the winner of the No. 3 Planet Jr. Seeder presented by Mrs. Sinclair Kennedy for the highest number of points for vegetable exhibits.

S. P. C. A. Prizes.—Mr. Fred Smith, Pembroke, was the winner of the first prize of two pounds for truck horse.

Mr. Peter De Silva, Devonshire, was the winner of the second prize of one pound for truck horse.

Mr. C. L. Richardson, Pembroke, was the winner of the first prize of two pounds for hack horse.

Purvis Prize.—Mrs. C. W. Kempe, Paget, was the winner of one pound presented by Mr. W. S. Purvis on behalf of the Robin Hood Flour Mills for the best loaf of bread made with Robin Hood flour.

The following for poultry:

Presented by General Trading Corporation, J. S. Vallis, Agent:

Dr. R. L. Tucker, Smiths, was the winner of one bag of Bermuda Fancy Scratch feed for the best female shown by a resident of St. Georges, Hamilton or Smiths Parish.

Mr. Jack Hallett, Pembroke, was the winner of a similar prize for the best female shown by a resident of Devonshire, Pembroke or Paget Parish.

Riddell's Bay Farm was the winner of a similar prize for the best female shown by a resident of Warwick, Southampton or Sandys Parish.

Presented by Bermuda Green Vegetable Growers' Association:

Dr. R. L. Tucker, Smiths, was the winner of one bag of Larro feed for the best male shown by a resident of St. Georges, Hamilton or Smiths Parish.

Mr. Jack Hallett, Pembroke, was the winner of a similar prize for the best male shown by a resident of Devonshire, Pembroke or Paget Parish.

Riddell's Bay Farm, was the winner of a similar prize for the best male shown by a resident of Warwick, Southampton or Sandys Parish.

Presented by Pearman, Watlington and Company:

Dr. R. L. Tucker was the winner of two bags of Purina feed for the best trio in the show, one bag of Purina feed for the best male and one bag of Purina feed for the best female.

The following competitions were open only to members of the Poultry Association:

Faulkner Shield.—Dr. R. L. Tucker was the winner of the Faulkner Shield for the best bird in the show.

Camden Cup.—Dr. R. L. Tucker was the winner of the Camden Cup for the best Plymouth Rock.

Poultry Association Cup.—Riddell's Bay Farm was the winner of the Society's Cup for the best exhibit in any one variety.

MINOR EXHIBITS

On the occasion of the visit to the Station of the Governor-General of Canada an exhibit of vegetables was staged. A similar exhibit was prepared when representatives of the Eastern Canada Fruit and Vegetable Jobbers' Association visited the Station when on their way to the Agricultural Conference at Trinidad.

The Department staged an exhibit of varied character at the Somerset Flower Show, 8th May.

At the close of the year material was collected for exhibit at the Convention of the Eastern Canada Fruit and Vegetable Jobbers' Association, to be held at Saint John in January, 1931.

BOYS' AND GIRLS' AGRICULTURAL CLUBS

A Club is connected with practically every school. Club work is confined almost exclusively to the preparation of exhibits for the Annual Agricultural Exhibitions. A few schools have gardens. Seeds were issued to the Clubs. Nearly all the schools were visited at least once during the year. It is regretted that more time and attention cannot be given to supervising and encouraging Club activities.

The yearly increase in the number of exhibits sent in by Club members is very encouraging:

1922	300
1923	893
1924	1,555
1925	2,304
1926	1,662
1927	2,427
1928	2,633
1929	3,249
1930	3,547

Following are comparisons of the numbers of entries received in each class in 1922, 1929 and 1930:

	1922	1929	1930
Horses	4	3	4
Cattle	4	13	16
Pigs	–	1	1
Goats	10	36	33
Rabbits	10	58	72
Poultry	10	98	68
Dogs	6	57	63
Vegetables	33	442	276
Flowers and plants	9	330	589
Fruits	–	59	73
Food products	37	712	716
Arts and crafts	173	1,437	1,636
Miscellaneous	4	–	–
Totals	300	3,249	3,547

Club exhibits of live stock showed no marked improvement over last year's, nor did vegetable exhibits, but the children's flowers were exceptionally good, as were food products, and the arts and crafts exhibits were, as a whole, the best yet exhibited.

Following are the names of donors and winners of special prizes. The Department is under obligation to the donors for their liberal prizes.

Trott Challenge Cup.—Berkeley Preparatory School Club was the winner of the Cup presented by Mr. W. J. H. Trott, M.C.P., for greatest advance over previous year's performance.

Montgomery Sears Cup.—Bermuda High School Club was the winner of the Cup presented by Mrs. Montgomery Sears for the greatest advance over previous year's performance with respect to points won for cut flowers. The Cup was held by Winifred Drake who won the highest number of points in that School.

B. G. V. G. A. Challenge Cup.—David Madeiros of Cavendish School Club was the winner of the Bermuda Green Vegetable Growers' Association Cup for vegetables exhibited by a boy.

Jackson Challenge Cup.—Mary Simons of Warwick Academy Club was the winner of Hon. W. E. Jackson's Cup for vegetables exhibited by a girl.

S. P. C. A. Prizes for Humane Posters.—Marion Christensen of Mount St. Agnes Club and Edwin Smith of Bermuda Grammar School Club were winners of first prizes for posters of humane design. Phyllis West of Mount St. Agnes Club, and Adrian Simons of Paget Glebe Club were winners of second prizes, and Charles Tucker of Temperance Hall Club was winner of third prize.

FARM LIVE STOCK

The number of domestic live stock in 1930 was estimated to be as follows:

Horses and other draught animals	1,850
Dairy cattle	1,700
Pigs	2,000
Goats	400
Poultry	20,000

The majority of the horses imported, 312, were from U. S. A. These were imported chiefly for livery work, and will gravitate to farms as they become unfit for the original purpose. Very few colts were raised locally. Guernseys continued to be the most popular family dairy breed. Reference is made elsewhere to the Station breeding stock. In most dairy herds are to be found a large proportion of Holsteins. The majority of calves are butchered, but a fair number of the best heifer calves are raised. Pig keeping is not in a satisfactory condition, due largely to the irregular demand for butchers' animals because of the importation of fresh pork. Goats are kept chiefly by the poor people. Poultry keeping continues to be domestic rather than commercial.

Better care of live stock is encouraged by the opportunity to exhibit animals at the Annual Agricultural Exhibitions, by the Board's Bylaws to control infectious animal diseases, by the Bylaws of the General Board of Health with respect to stabling and the like, and by the activities of the local Society for the Prevention of Cruelty to Animals.

FARM LABOUR

The shortage of farm labour was made less acute by the reduction of acreage under crops. Labourers were admitted from the Azores on application by farmers. It will be by improved farm methods rather than immigration that labour difficulties will be solved, though the nature of the land and crops will always call for the employment of a large number of men per acre.

A survey of twenty cases made in August showed that 91 per cent of the Portuguese immigrants brought in to work on farms had remained with their original employers through the first season, and some longer.

COLONIAL AGRICULTURAL SERVICE

The scheme for the organisation of a Colonial Agricultural Service, approved in 1927 by the Colonial Office Council and subsequently referred to the Colonies, was considered by the Board, and a majority were not in favour of this Colony being included in the scheme.

STAFF

Mr. E. A. McCallan, Director of Agriculture, was absent from the Colony on duty on the folowing occasions: From 14th January to 8th February to attend the Agricultural Conference, Trinidad; from 17th June to 11th July to attend the Tariff Conference, Trinidad; from 19th July to 18th August to survey market conditions in Eastern Canada, and from 15th November to 1st December as a delegate to Ottawa; reports were presented. The Director was re-appointed on the Immigrant Labour Board and Committee under the Veterinary Science Practice Act, 1929, and a trustee of the Bermuda Biological Station.

Dr. H. S. Cunningham, Plant Pathologist, was absent from the Colony to attend the Imperial Horticultural Conference, London, and other conferences, and on vacation leave, from 20th July to 20th October; a report was presented. The Pathologist acted at times for the Director when the latter was absent from the Colony, and was temporarily appointed a member of the Immigrant Labour Board.

Mr. W. R. Evans, Agricultural Assistant, acted as Officer-in-Charge during the Director's absence in July and August, and was temporarily appointed a member of the Immigrant Labour Board.

Mr. E. L. Adams, Inspector of Produce, was on vacation leave in the United States of America from 1st September to 24th November.

Mr. J. C. Nauen, Horticulturist, was on vacation leave from 25th August to 23rd September.

Dr. R. L. Tucker, Government Veterinary Officer, was on vacation leave from 11th October to 8th November and on 9th November was retired on pension, having reached the age limit after sixteen years' service. Dr. Tucker can look back on a period of service during which the Colony was free from serious outbreaks of contagious animal diseases.

Mr. C. J. Cooper, was appointed Government Veterinary Officer vice Dr. R. L. Tucer.

Mr. T. Arthur Hollis was re-appointed Assistant Inspector of Produce for the period 1st January to 30th June. He was absent on duty in Canada and New York on two occasions: From 30th April to 28th May, and from 12th to 23rd June.

Mr. C. V. S. Early, Mr. J. W. M. Gibbons and Mr. T. J. Outerbridge were appointed Sub-Inspectors of Produce.

Mr. C. V. S. Early, Station Foreman, completed twenty years service with the Department on 23rd May. He has no pension rights.

FINANCIAL

The expenditure of £7,015 was authorised by the Appropriation Act of 1929 and Resolves 12 and 33. This is exclusive of salaries. The sum of £6,952. 14. 2. was spent, and a balance of £62. 5. 10. remained at the close of the year's accounts.

The sum of £247. 18. 9. was reimbursed to the Treasury.

Details of expenditure and reimbursements will be found in Appendices E and F.

During the last ten years the expenditure of the Department (exclusive of salaries) and the receipts for sales of vegetables, etc. were as follows:

Year	Expenditure	Receipts
1921	£5,488 15 2	£176 1 11
1922	6,905 18 2	68 17 4
1923	4,163 6 10	75 0 11
1924	4,515 10 8	182 19 3
1925	4,851 16 7	129 18 9
1926	5,169 6 5	207 8 9
1927	4,560 15 5	346 2 4
1928	4,175 5 11	157 10 8
1929	4,348 6 10	193 0 1
1930	6,952 14 2	247 18 9

Respectfully submitted,

E. A. McCALLAN,
Director of Agriculture.

Agricultural Station,
Bermuda.
22nd September, 1931.

Report of the Plant Pathologist, 1930.

The Director of Agriculture,

I have the honour to submit my report for the year 1930.

Record of Movements, etc.

I was Acting Director of Agriculture during your absence from the Colony from 14th January to 8th February; I acted as Officer-in-Charge of the Department during your absence from 17th June to 12th July, and again from 15th November to 1st December. I was absent from the Colony as official delegate to the Imperial Horticultural Conference, the International Horticultural Congress and the Imperial Botanical Conference, and on leave from 20th July to 20th October.

Spraying Machines.

Power Sprayer No. 2 was completely reconditioned in March of this year. Both machines gave satisfactory service until November, when a serious break rendered one of the machines useless. Owing to lack of funds, this machine could not be repaired until January, 1931.

There has been an increased demand for these machines during the year, more especially in the Parishes of Smiths, Devonshire and Hamilton. The single machine kept at the Station was not able to cope with the situation. The demand for these machines is seasonal, and I question the advisability of purchasing more machines. What is badly needed is two motor trucks upon which the sprayers can be mounted. This would save an enormous amount of time in moving from job to job, would reduce the wear and tear due to moving, and would also enable us to keep at the Station the sprayer ordinarily stationed at Southampton. The machine kept at Southampton serves a useful purpose in that district, but owing to the difficulty of transportation, can scarcely be used elsewhere.

One of the crying needs in Bermuda at the present time is more and better machinery for the application of insecticides and fungicides. Many of the larger growers should have modern equipment of their own. While the initial expenditure would be considerable, the expenditure would be well warranted by the results. The smaller growers in different sections might well club together, and purchase proper machinery. The fact that most of the smaller growers are tenant farmers is a bit of a handicap to such a scheme, but not necessarily against it working out properly.

Certain it is that the potato growers need more suitable machinery for spraying than is at present available. The machines owned by the Department are not suitable for the proper spraying of potatoes, although they have been used for that purpose with remarkable success.

Inspection of Lily Fields.

The first inspection of lily fields was commenced on 8th February and completed on 1st March. The second inspection was commenced on 17th March and completed on 28th March.

Three fields were condemned at the time of the first inspection. The majority of the fields were up to the standard at the time of the second

inspection, and those that were not were subsequently passed after they had been cleaned up.

Two field inspections of lilies during the season has worked out extremely well in practice. It is a well known fact that some growers, at least, are wont to leave diseased plants in the fields until the inspector is due to visit the district. The early inspection has resulted in this type of grower removing diseased plants considerably earlier than would otherwise be the case. As early and careful roguing is essential to success in stamping out virus diseases, the early visit of the inspector serves a useful purpose in this respect.

The fight against virus diseases will never be completely won by any number of inspections. It will, and does, reduce the amount of seasonal infection in marketable bulbs, but anything like freedom from virus diseases can only be obtained when each individual grower realises his responsibility in this matter, and tackles the problem in earnest.

One regrettable feature of the present situation is the failure to rogue the stock. Only fields likely to produce marketable bulbs are subject to inspection, and such being the case, many growers are indifferent to diseased conditions in their stock. They fail to realise that neglecting to care for the stock is simply putting off the evil day, with the inevitable result of heavy losses in marketable bulbs at a later period.

In spite of these difficulties, some progress is being made, and the general condition of the lilies throughout the Colony is being bettered. Much yet remains to be done, not only in the matter of virus diseases, but with other lily troubles as well. It would seem that there is need for some careful and rather extensive work dealing with manurial and cultural practices. Problems of this sort are not infrequently closely associated with diseased conditions, and at the present time very little data is available on this subject under Bermuda conditions. Not only are these problems associated with diseased conditions, but they are of paramount importance as influencing yields and cost of production, both items of intense interest to the grower and more especially in the present depressed condition of agriculture in general.

Office Work.

Little or no progress has been made during the year in placing the pathological publications in a condition for ready reference. In fact, it has hardly been possible to keep pace with the incoming literature. More clerical help is badly needed, in order that not only the pathological literature, but the whole Station library may be put in a condition where it will be accessible and useful.

A good library is an essential part of the equipment of any experimental station, but even the best library is of little value unless thoroughly indexed, so that articles of importance may be readily accessible. At the present time we receive reports from many stations in various parts of the world and also a number of periodicals dealing with general agriculture, horticulture and pathological subjects. Many of the articles contained therein are important and should be available for ready reference. It is hoped that before another year has passed arrangements can be made to have this necessary work properly done.

Quarantine Enforcement.

While the amount of nursery stock imported into the Colony has not materially increased during the year, the actual amount of time necessary to devote to this part of my duties has increased greatly. This can be accounted for by the increased number of ships discharging both passengers and cargo. This is also accompanied by a more frequent mail service. These necessitate more frequent visits to the docks and to the General Post Office, in order to delay as little as possible any nursery stock reaching its final destination. While this work is an important one, it interferes very seriously with a study of the many problems facing the pathologist and which need serious attention.

International Congresses.

As already recorded, I had the pleasure and honour of representing this Colony at the Imperial Botanical and Horticultural Conferences and the International Horticultural Congress, all of which were held in London, England. I also acted as this Colony's representative at the International Botanical Congress held at Cambridge, England. All of these meetings were extremely interesting and instructive. The main features of these meetings have already been dealt with in a special report, and it is not necessary to deal with them here. Aside from the valuable information contained in the papers presented, the opportunity offered to meet scientific workers from various parts of the world at such gatherings is invaluable to the scientist. Undoubtedly the contacts made, the opportunities given for the discussion of subjects of mutual interest, the new light thrown on knotty problems by different view-points, all tend to broaden the mind and to renew one's interest in one's own problems. Such gatherings are a real inspiration to any man, and more particularly to the isolated scientific worker.

I would like at this time to pay a tribute to the officials connected with these conferences and congresses, members of the staffs of experimental station and institutes, and English and European scientists in general. These people, and in fact everyone with whom I came in contact, were most courteous and did everything possible to make my visit both pleasant and profitable.

Chlorosis of Lilies.

A chlorotic condition of the *Lilium Harrisii* is not uncommon in many of the lily fields of Bermuda. This condition is more commonly found in small patches in fields, and does not necessarily seem to be associated with shallow or poor soils. Occasionally one comes across small fields in which all the plants show this chlorotic condition to a greater or less extent. It is not uncommon for plants showing this chlorotic condition early in the season to gradually assume a normal green colour later on. In several cases, however, and this was particularly noticeable this season, the plants bleach out until they are almost white, produce no flowers, make very little growth, and die back early in the season.

This condition is an interesting one, and of considerable importance to the lily growers of the Colony. In order to study this condition more closely and to try, if possible, to arrive at the cause, a small area of land has been rented. The piece of land secured for this purpose is conveniently situated, and was planted to lilies last season. At that time practically

every plant in the field showed chlorotic symptoms. A rather extensive experiment has been laid out on this area, and already some interesting results have been observed.

Scale on the Native Cedar *(Juniperus bermudiana)*

On 20th February of this year a scale insect was reported on native cedars growing at Tuckers Town. A few trees in this locality had been severely injured by this insect. This scale had not previously been observed, or at least there is no record of its having been collected. Specimens were immediately sent to the Imperial Entomological Institute and to the Bureau of Entomology, United States Department of Agriculture, for identification. The Imperial Institute reported it as being a new species belonging to the genus *Chrysomphalus.* Recently the United States Bureau of Entomology have tentatively placed it as *Chrysomphalus agavis,* although recognising slight variations from the *agavis* characters. This scale insect is comparatively small and inconspicuous and might easily be overlooked. In minor infections the scale is found at the base of the leaves, and only careful scrutiny reveals its presence. It is only when it becomes sufficiently massed to cause injury to the tree that it becomes conspicuous.

Immediately following the discovery of the scale a somewhat hasty scouting was made from St. Georges to Somerset, and careful examination revealed the fact that it was widespread throughout the Colony. It is impossible to say at this time just how or when this insect first made its appearance in Bermuda. The fact that it is so widespread would seem to indicate that it is not of very recent introduction. While it would be interesting to know these facts, the seriousness of the pest and control measures to be adopted are the important factors to be considered at this time. Experimental trials have shown that the insect can be controlled by spraying with soluble lime-sulphur. This method of control may be used in certain areas, but is not feasible as a general control measure owing to the wide distribution of the cedar, its dense growth, and the many areas clothed with cedar trees which are inaccessible to spraying apparatus. The one hope lies in the fact that there is some evidence of parasitism, although to date this has not been proven. At the present time it constitutes an important problem for this Department.

Diseases and Pests.

Beans.—Powdery mildew, caused by *Erysiphe polygoni,* continues to be the greatest drawback to the successful production of snap beans in this country. The leaves, stems and pods are covered with a white powdery mildew scarcely visible, except on close scrutiny. The leaves curl and roughen, yellow and die prematurely. The fruit does not set freely, and what does set is stunted. Frequent dusting with sulphur should check this disease, and dusting should be commenced when the plants are quite small.

Cabbage.—During the months of November and December cabbage and other cruciferous crops were badly damaged by the cabbage looper *(Autograph brassicae).* The larvae of this moth are pale to dark green in colour and marked with several longitudinal white lines which become obscure as they become full grown. When full grown the larvae resemble very much the common cabbage worm, but may easily be distinguished by the characteristic "looping" when moving about.

This insect can be controlled by spraying with arsenicals to which has been added a little soap or some good sticker. If spraying is begun early in the season, there will be little danger from late broods of loopers.

Both cabbage and broccoli suffered from black rot in November and December. This disease is caused by a bacterium, and is known to be transported on the seed. The organism lives over in the soil in refuse material from the affected crop. It is widespread throughout the Colony, and constitutes a serious drawback to the growing of cruciferous crops. Seed disinfection should be practised to prevent infection from seed source, and if possible, no cruciferous plants should be allowed to grow on infected land for a period of two or three years.

Celery.—Late blight was present in most celery fields during the season. In a few cases the plants were so severely injured as to render them unsaleable. These few cases could be traced to lack of proper precautions in the seed-bed and throughout the season. Some of our growers do not realise the necessity for careful examination of plants at the time they are set out in the fields. Proper attention in the seed-beds and careful selection of plants when transplanting to the field will do more to prevent outbreaks than any subsequent treatment in the field. The Bermuda method of close planting in the field does not lend itself to easy and thorough application of fungicides. The plants do not dry off rapidly after rains and heavy dews. The excessive moisture and lack of proper circulation of air form ideal conditions for the development of the pathogene. Some growers also make a mistake in their method of planting a seed-bed. The seed is sown broadcast, and as a result, the plants are so thick in the bed that it is difficult to treat them effectively with fungicides. Plants grown under these conditions are spindly, and do not come along quickly after they are transplanted to the field.

More of the celery fields contained a certain percentage of plants showing a distinct chlorotic appearance. These almost white plants presented a very striking appearance dotted through the dark green mass of healthy plants. Many of such plants were examined to see if there was any nematode injury apparent, but, with the exception of a few individuals, there was no evidence of this trouble. Up to the present I have not been able to give any satisfactory explanation of this condition.

The tarnished plant bug *(Lygus pratensis)* caused severe injury to celery plants in at least two sections. Celery in the fields as well as in the seed-beds was affected. In all cases the fields or seed-beds were adjacent to fields covered with weeds which were badly infested. This insect is a difficult one to control, and under the conditions existing any control measures would have been useless, as the celery in all probability would have been speedily re-infested from the adjacent weeds. It is particularly desirable that growers should use better judgment in the location of their celery seed-beds. When placed in close proximity to fields of sweet potatoes or waste lands covered with weeds, there is every possibility that the celery will become infested from these sources.

Egg-plant.—Aphids were plentiful throughout the season, and as a result the foliage was severely injured.

Lilies.—Phytophthora rot was common in many of the lily fields during December. The situation was aggravated by the abnormally heavy rainfall for that month. Aside from the spread due to washing of the soil, it was almost impossible to carry on spraying operations owing to the

continuous and heavy rainfall. The loss from rot will be a heavy one again this season.

Yellow-flat was present to some extent in most fields in the Colony, but only a few fields showed an abnormal amount of this disease. The value of early roguing was well illustrated in the case of many of the growers. The men who have followed this practice have had very little trouble this season.

Mosaic in its many forms continues to be the major trouble in our lily fields, and it is difficult to get the growers to realise the necessity of removing diseased plants. The fact that the symptoms are not always clear-cut frequently makes it difficult to diagnose the disease, and the grower hesitates to remove a plant which he is not convinced will not recover its normal condition. There is, however, a general improvement in this respect, and, although it will take time, one can afford to be hopeful.

A careful study of many fields and a critical examination of hundreds of plants would seem to indicate that the bulb mite is very prevalent in Bermuda lily fields. There is considerable controversy as to whether the bulb mite attacks healthy bulbs or only attacks those which have started to decay from other causes. This is a point which is not easy to prove, but my own observation leads me to believe that the bulb mite is responsible for much injury to otherwise healthy bulbs, and that such injury is followed by rotting due to other causes. Examination of many bulbs producing weak and unhealthy plants revealed the presence of bulb mites working at the base. In such cases the basal root development was invariably poor, and there was ample evidence of injury without necessarily any evidence of rots. In many cases the mites had burrowed deeply into the scales and the base of the bulbs.

Onions.—Onions at the Station were severely injured by the ravages of a leaf miner. Other plantings examined showed more or less injury due to the same cause.

Potatoes.—Late blight was first observed on 2nd January. This was somewhat earlier than is commonly the case. The dry weather experienced in the latter part of the season was unfavourable to the development of the fungus causing this disease. If properly handled, this disease should not cause serious injury in Bermuda. Most of the growers, however, do not commence control operations until too late to be entirely effective. Spraying or dusting operations should begin before the plants are moulded, and not after, as is the common practice. Applications of fungicides should be made regardless as to whether there is any sign of the fungus or not. The treatments recommended are preventative ones and are of little value after infection has occured. Careless applications of fungicides is another factor mitigating against the success of control measures. It is not sufficient to squirt a little Bordeaux on the tops of the plants. The whole plant must be thoroughly covered, and considerable pressure is necessary for a thorough job.

Early blight, although it made its appearance in the fall crop of Triumphs, did not cause as much trouble as is ordinarily the case, possibly due to the unusually low temperatures prevailing during that period.

Sweet Peppers.—In the early part of the season considerable injury was caused to the foliage of sweet peppers by a species of *Cercospora*.

Leaf hoppers were exceedingly plentiful on the leaves of this plant throughout the season and severe injury resulted from their attacks.

Tomatoes.—Septoria leaf blight is the most common and destructive of the diseases attacking tomatoes. This is particularly true of tomatoes grown in the early part of the season. Only the most careful and constant attention to the application of fungicides will keep this in check.

Timber rot caused by *Sclerotinia sclerotiorum* was present to some extent in some plants, but was not responsible for any heavy losses.

During the months of November and December the cabbage looper caused severe injury to both foliage and fruit of the tomato. The larvae burrow their way into the fruit, and, although not burrowing deeply, they destroy a large area before they mature. While the injured portion of the fruit usually heals over, it presents an unsightly scar, distortion takes place, and the fruit is unfit for shipment. It frequently happens that bacterial soft rot follows the injury, and such fruit is a total loss. The addition of arsenicals to the Bordeaux when spraying for leaf blight will check the ravages of this insect.

Respectfully submitted,

H. S. CUNNINGHAM,
Plant Pathologist.

27th January, 1931.

Report of the Inspector of Produce for the Season of 1929-1930

The Director of Agriculture,

I have the honour to submit my report for the season of 1929–1930.

Inspection of Seed Potatoes

Triumphs.—Imported from Nebraska 510 bags (120 lbs. each) for March planting; to be re-planted for early Fall crop. From Long Island, N. Y., 3,454 barrels; to be planted for Fall Crop.

The Triumph seed was sound when inspected.

Garnets.—From Nova Scotia 4,952 barrels, and from Prince Edward Island 681 bags.

The Garnet seed was sound, and looked well when inspected; some of the tubers were very large.

Cobblers.—From Nova Scotia 280 barrels and 150 bags.

The Cobbler seed was good. A much smaller importation than last year.

Inspection of Produce

The first shipment of potatoes was made on 22nd November, 1930, and on 2nd December 35 crates of kale were exported.

The following comments are made on the various vegetables shipped:

Beets were poor, and a very small quantity grown.

Carrots were good; the majority were small compared with those of last year. About ninety per cent were shipped without tops.

Celery was not as good throughout the season compared with that of recent years. At the latter part of the season shipments were poor, because of Late Blight and insufficient rain. In some sections the late crop was a total loss.

Kale was very good through the season, with freedom from yellow leaves. The quantity was below that of last year.

Onions were of good quality and very small in quantity.

Parsley was fairly good in quality during the first shipments, and improved very much as the season progressed.

Potatoes.—The first shipments were grown from Bermuda Triumph seed. A very small percentage were Garnets. Compared with that of the previous year, the yield of Cobblers was fairly good, and the tubers kept better than did those of last season.

Tomatoes.—The tomato crop was good in quality, and showed better grading and packing when offered for shipment. I would like to state that in my opinion the proper place for packing tomatoes is at the packing shed at the Agricultural Station.

Quantities Shipped

	United Kingdom	Canada	West Indies	U. S. A.	Other Countries	Totals
Beets	–	388	18	83	–	489 bushels
Cabbage	–	2,061	–	–	–	2,061 "
Carrots	–	16,840	70	2,345	–	19,255 "
Celery	–	17,102	–	95,978	–	113,080 "
Kale	–	–	–	14,220	–	14,220 "
Onions	–	10,322	267	148	–	10,737 "
Parsley	–	–	–	11,431	–	11,431 "
Potatoes	–	452	13	65,488	–	65,953 "
Tomatoes	–	6,581	–	–	–	6,581 "
Miscellaneous	–	122	–	660	–	782 "
Lily bulbs	430	286	–	4,719	73	5,508 cases
Totals (exclusive of lilies)	–	53,868	368	190,353	–	244,587 bushels

The average yearly export of vegetables during the decade 1920 to 1929 was 397,371 bushels, of which the above total is 61 per cent.

Produce Rejected.—The following produce was rejected on first inspection, but much of it was passed when inspected the second time after corrections had been made in it.

Celery	1.94	per cent
Kale	0.02	" "
Onions	5.54	" "
Potatoes	2.83	" "
Tomatoes	3.54	" "
Other vegetables	5.55	" "

Appeals.—One; decision of Inspector upheld.

Prosecutions.—None.

Supervision of Chill-Rooms.—Throughout the season the chill-rooms on the steamers were frequently inspected by Sub-Inspector J. W. M. Gibbons and myself, and I have the satisfaction of reporting that the stowage was good at all times. Breakage of crates was much less than in former years, due in large measure to better crate material.

Assistant Inspector in New York and Canada.—The Assistant Inspector, Mr. T. Arthur Hollis, was in Canada and New York at times during the season.

Acknowledgment.—I wish to record my personal appreciation of the Wharfingers, the Dock Purser and the Chief Engineer of "Bermuda" in connection with the loading and carrying of the crops.

Inspection of Box Material

All box material was inspected at time of importation; the material was of good quality as a rule.

Inspection of Lily Bulbs

Bulb inspection began on 14th June, and continued at seven packing sheds until the latter part of August. The bulbs were good, but the crop was shortened about 45 per cent by what are known locally as "blind bulbs", caused, in my opinion, by too much rain during the early part of the growing season, followed by a dry spell which checked the growth, and later too much rain again. Considerable loss was occasioned by basal rot. The field inspection of the Plant Pathologist rendered much easier my inspections at shipping time.

Farmers' Market

During the season under report a varied lot of produce was offered for sale, and I am pleased to state that all the stalls, five in number, were occupied during the season. During the latter part of the year another stall was added. The vendors appeared satisfied with their sales on the whole. Improvement has been made in the market room by putting sliding screens to the windows.

Summer Duties

Other summer duties were reported on monthly.

Recommendations

Green vegetables for export should be planted in rotation and not planted all at one time. One-third should be planted at one time and another third later, and so on; thereby giving a fresh lot of vegetables at all times.

Packing Shed

I am very pleased to state that a packing shed has been built at the Agricultural Station, and has proved satisfactory in grading and packing tomatoes. I would like to see this shed used for the inspection of lily bulbs.

Farmers' Meetings

I still say that more frequent meetings of growers should do much to educate and to help them to grow and pack better produce. The present day grading and packing is far behind that of other countries.

Respectfully submitted,

E. L. ADAMS,
Inspector of Produce.

Devonshire,
6th January, 1931.

Report of the Horticulturist, 1930

The Director of Agriculture,

I have the honour to submit my report for the year 1930.

Outside Work.

The Station grounds were kept in satisfactory condition throughout the year; flower beds, shrubberies, hedges, driveways and lawns being regularly attended to.

The purchase of a motor mower in September proved labour-saving; and much additional mowing was accomplished.

Little planting, other than with shrubs and annuals, was practicable. This was due to the very limited planting space, and small quantity of trees and palms sufficiently large for planting out. It is hoped that a new citrus orchard can be made south of the slat-house in place of the existing one, and the old site converted into a lawn. This would open up the southern end of the Station into one large lawn, thus providing a considerable area for additional planting.

Experiments in connection with the improvement of the Harrisii lily were begun; various varieties and hybrids were planted. Hyacinth bulbs, also, were planted experimentally. The economic experimental plots were planted out with various economics, chiefly fruits.

Results obtained from the various sowings of flower annuals were in most cases good, in spite of the very wet weather which prevailed during their seedling stage. The new variety of Calendula, "Radio", germinated very well.

Inside Work.

The glasshouses and slat-house were kept fully stocked with young plants and seedlings. It became necessary to prepare a site south of the slat-house on which to stand established plants to prevent overcrowding. Further slat-houses are greatly needed, in order to house the ever increasing stock of plants.

Sowings of seeds of sub-tropical and tropical plants received from abroad (which are sown in pots) germinated fairly well, and resulted in many additions to the Station collection. Of these, several trees and palms should prove very valuable to the Colony for roadside planting. Had it been possible to give the whole-time service of one man to this work and the care of young plants, better results would have been attained, as it is essential that constant attention be given seedlings and young plants. Cuttings of various plants, chiefly shrubs, were made and rooted.

I estimate that the stock of young and established plants at the Station to number approximately twenty thousand.

Office and Herbarium Work.

A considerable amount of time was spent in connection with the exchange of seed. Correspondence and other clerical work were kept up to date, and seeds were collected and distributed. Owing to the very small quantity of seeds procurable of some species, it was found impossible to

satisfy all demands. This was especially noticeable in the case of Cedar and Pimento. The Seed Exchange List for 1931 was prepared and circulated. It consisted of six mimeographed sheets containing over two hundred and sixty plants names, arranged under their families.

Preparation of descriptive and alphabetically arranged lists of some six hundred and fifty species and numerous varieties of newly introduced trees, shrubs and climbers to date and others, was completed. A popular guide to Bermuda's flora, also, was completed.

The Horticultural Section of the Exhibition Catalogue was rewritten, all plants being placed under their common names instead of their scientific, as in former catalogues.

Herbarium specimens of endemic plants were prepared and sent abroad, on request. Numerous plants sent in for identification were determined; thanks are due to the Directors of the Royal Botanic Gardens, Kew, England, and the New York Botanic Gardens, U. S. A., for help given in connection with this work.

Rough general and sectional plans of the Station were prepared. As these show the relative position of all plantings, they are very useful during planting operations.

Damage to Station Property.

The wind-storm on 26th August caused considerable damage to trees, palms and other plants. Several large trees were blown down. After severely pruning, it was possible to re-set a *Ficus religinosa* and an *Albizzia Lebbeck*, both of which have recovered.

Much annoyance was caused by the removal of labels from trees and plants, and the breaking down of young trees and shrubs. A watchman or keeper is badly needed.

Acknowledgment of Seeds and Plants Received.

Through the seed exchange over one thousand packets of seeds and some hundred plants were received. The Department is greatly indebted to the Directors and Superintendents of the undermentioned stations, with whom seeds and plants have been exchanged, for their contributions and co-operation in connection with this work.

BRITISH.

Departments of Agriculture.

Queensland, Australia
Victoria Australia
Barbados, B. W. I.
Dominica, B. W. I.
Montserrat, B. W. I.
St. Lucia, B. W. I.
Trinidad, B. W. I.
Ottawa, Canada
Kuala Lumpur, Federated Malay States
Bathurst, The Gambia
Aburi, Gold Coast
Hong Kong
Southern Rhodesia
St. Helena
Tanganyika Territory
Kampala, Uganda

Botanic Gardens and Other Institutions.

Melbourne, Australia
Trinidad, B. W. I.
Vancouver, Canada
Paradeniya, Ceylon
Cambridge, England
Hyde Park, London, England
John Innes Institute, Merton, England
Kew, Surrey, England
Saharanpur, India
Dublin, Irish Free States
Dunedin, New Zealand
Victoria, Nigeria
Edinburgh, Scotland
Glasgow, Scotland
Kirstenbosch, South Africa
Singapore, Straits Settlements

FOREIGN.

Departments of Agriculture.

Giza, Egypt
Honolulu, Hawaii
Manila, Philippines
Washington, D.C., U. S. A.

Botanic Gardens and Other Intsitutions.

Graz, Austria
Innesbruck, Austria
Brussels, Belgium
Sofia, Bulgaria
Carolinae University, Prag, Czechoslavakia
German University, Prag, Czechoslavakia
Seed Testing Station, Brno, Czechoslavakia
Copenhagen, Denmark
El Saff, Egypt
Brignoles, France
Marseille, France
Montpellier, France
Berlin, Germany
Amsterdam, Holland
Groningen, Holland
Wageningen, Holland
Di Palermo, Italy
Parma, Italy
Rome, Italy
Trieste, Italy
Zagreb, Jugoslavia
Kaunas, Lithuania
Algiers, North Africa
Oslo, Norway
Warsaw, Poland
Bucharest, Roumania
Leningrad, Russia
Taschkent, Russia
Valencia, Spain
Upsala, Sweden
Basel, Switzerland
Zurich, Switzerland
Montevideo, Uruguay, South America
Brooklyn, N. Y., U. S. A.
Cambridge, Mass., U. S. A.
East Lansing, Mich., U. S. A.
New York, N. Y., U. S. A.

In addition, we are indebted to the undermentioned subscribers:

Abroad.

Sir Reginald A. Rody, Northampton, England; Mr. A. L. De Villiers, Cape Town, South Africa; Mr. W. Alick Lawrence, Venezuela; Mr. Robert Dunn, New York; Mr. A. M. Lowman, New York; Mr. M. Wittke, Nice, France.

Local.

His Late Excellency Lieutenant-General Sir Louis Jean Bols, Admiral Sir C. Fuller, Mr. C. A. Baker, Rev. Father W. Cox, Colonel William V. Ewers, Miss Mary Gray, Mrs. Sealey Gray, Mrs. L. B. Harnett, Mrs. Wheatley Jones, Wor. J. Scott Pearman, M. C. P., Mr. C. F. Rogers, Mrs. A. B. Smith, Mr. F. W. Stephens, Mr. R. R. Swainson, The Tucker's Town Development Company.

Approximately nine hundred and fifty packets of seeds were dispatched abroad. Plants, numbering approximately eight hundred, were given free of charge to Arbor Societies, Church bazaars, and in exchange. Cuttings and seeds were also distributed.

Recommendations.

Citrus and Other Fruit Growing.—It is recommended that citrus and other sub-tropical fruits be grown on a larger scale than is done at the present time. During the past two and a half years experiments with various sub-tropical fruits, chiefly belonging to the *Anoniaceae, Myrtaceae, Rutaceae* and *Sapotaceae* families, have been in progress, and in the majority of cases very good results can be reported so far as growth, vigour and suitability are concerned, and there appears to be no doubt that they will fruit well in due course. Diseases which in the past have discouraged many of the would-be growers can easily be kept in check by periodical spraying.

Roadside Planting.—It is recommended that some scheme be devised whereby all roadside planting work in the Colony be directed from the Station. To date the whole of the planting work has been left entirely in the hands of the various Parish Arbor Societies, and although several have made good progress, comparatively little has been accomplished in the Colony as a whole. As pointed out in a previous report, this is not due to lack of enthusiasm on the part of the Societies, but to their inability to obtain sufficient funds to do the planting work, to lack of skilled labour, which cannot be procured unless on whole-time, and to the difficulty of obtaining permission to plant from the landowners. Difficulties of procuring suitable trees and palms of good planting size should be remedied in the course of a few years when the Station stock of plants, which is being grown entirely from seeds, will have attained good size. In the meantime plants should be procured from the West Indies, in order that this very urgent work will not be deferred.

Personal, Visits, Addresses, etc.

I was granted vacation leave from 25th August to 22nd September inclusive.

During the absence of the Plant Pathologist from the Colony I inspected all plants and bulbs at the General Post Office and at the docks, and gave attention to other routine work.

Recorded visits for the year numbered two hundred and thirty-two. Meetings of the Pembroke Arbor Society and the Somerset and Bermuda Garden Clubs were attended and addressed.

Collecting trips for seeds and plants were made to the Walsingham, Paynter's Vale, Abbot's Cliff and the Marsh districts.

Respectfully submitted,

J. C. NAUEN,
Horticulturist.

9th January, 1931.

APPENDIX A

RAINFALL RECORDED AT AGRICULTURAL STATION, 1930

January	2.87	inches
February	6.30	"
March	6.29	"
April	3.08	"
May	.72	"
June	8.37	"
July	1.78	"
August	4.08	"
September	1.68	"
October	8.16	"
November	3.62	"
December	12.25	"
Total	59.20	inches

APPENDIX B

REPORT ON THE BERMUDA BULB TRADE IN GREAT BRITAIN DURING 1930

The events of the past season provide much valuable information, and for the first time since the War it is possible to form a definite opinion of the prospects in this market.

Up to 1928 the steps taken to revive the business were necessarily tentative. In 1929 there was, relatively speaking, a very large increase in the quantity of Bermuda bulbs sold here; but (as pointed out at the time) it was impossible to judge how much was attributable to the dislocation of the Japanese trade, and to what extent we should be able to maintain the advantage in more settled conditions.

The total quantity we have sold this year is 371 cases or 54,900 bulbs. This shows an increase of 65 cases or 21 per cent on last year's total. In 1929 the figures included 52 cases sold to Covent Garden Market Growers; none of these customers bought this year, and therefore the actual increase among other sections of the trade is 65 plus 52, or 117 cases. In the circumstances, we think that this result is by no means unsatisfactory, particularly when it is added that the average price realised was ten shillings higher than in 1929.

The Bermuda Harrisii has now regained a place for itself in the trade, and there is beginning to be apparent a real appreciation of its particular merits. It is a high class article, and we have always maintained that the right policy is to offer it as such, and to keep it out of the cheap trade. The fact that it cannot be treated as an out-of-door plant (at any rate in some parts of Great Britain) imposes limits on the trade obtainable among the public; but sales have not yet reached the maximum possible, and there is also a large field for further progress amongst local nursery-men (that is, those who retail the flowers themselves, as distinguished from the Covent Garden Growers). We think that it is now justifiable to say that the foundation of a steady business has been made. In dealing with a highly priced (for this market) article, sudden expansion is hardly to be expected; therefore patience may still be needed. At the same time, progress has been made, and the hardest part of the work has been

accomplished, which was to overcome the bad reputation created by the diseased and poor quality bulbs of the old days.

Prices.—The increase was the cause of losing sales to a few customers, and several complained, but, on the other hand, the effect has not been so great as to prevent good business. On the whole, therefore, it seems that the higher price was justified; but in our opinion it would be unwise to attempt any further increase. The difference of ten shillings in favour of wholesale houses has worked satisfactorily, but of course it has to be confined strictly to those entitled to receive it.

Health.—Yellow Flat disease (which is prevalent in many Japanese consignments) appears to be effectively held in check by the present Regulations, and no cases among Bermuda plants have been brought to our notice this year. We have seen Mosaic disease on several occasions, and we think a further effort might be made to eliminate it. On the whole, however, the position in regard to health is good.

Grading of Sizes.—This matter is not satisfactory. The trouble is not confined to the bulbs of any particular grower, and we do not suggest that undersizing is deliberate; in fact we think it likely that the weather, or some other factor, may cause the bulbs to run small in certain years. However that may be, the fact remains that lately the 9—11 inch size almost invariably shows all bulbs exactly 9 inches, and in some cases the 7—9 inch are all 7 inch. If the gradings 9—11 and 7—9 are intended to mean 9 and 7, it would be better to sell as 9 and 7. It is true that many buyers let them pass without comment; that, however, does not justify what practically amounts to a misdescription. This year four customers fastened on the point; on investigation we were obliged to admit the truth of their contentions, and to concede allowances. There are several ways by which the complaint could be avoided. The bulbs could be sold in 1-inch grades, i.e., 7—8, 8—9, 9—10, 10—11 inches, or percentages could be fixed, i.e., not less than 30 per cent of 10 inch bulbs in a 9—11 case, or the bulbs could be described simply as 9-inch and 7-inch. As this point is now practically the sole cause of complaint met with any frequency, it would be a mistake not to put it right. We think that the Board may perhaps be able to obtain the views of the growers, and adopt some general measure of improvement.

Shipment via Canada.—We understand that this route is cheaper than via New York, but it seems less reliable. One shipment was 25 days on passage, while another took only 14. Having regard to the importance of Bermuda bulbs arriving well ahead of the earliest Japanese shipments of Formosum, we think that the New York route should still be used on occasions when the connection at Montreal is doubtful.

Advertising.—Two important new features were introduced. Plants from the bulbs provided by the Board were shown at the Royal Horticultural Society in April and afterwards transferred to the Ideal Homes Exhibition. We cannot speak too highly of the efficient manner in which Messrs. James Carter and Co. carried out their part, and a Silver Banksian Medal was awarded by the Royal Horticultural Society. The flowers attracted a great deal of attention at both places and were mentioned in the daily press, as well as in the gardening papers. We have reason to know that benefit has come from these Shows, and we consider it to be one of the most effective methods of obtaining publicity in the right quarters. It will be repeated next year.

Bermuda lilies, grown from bulbs presented by the Board, were also seen at Kew Gardens and in Hyde Park.

Another new scheme was the provision for a number of the leading firms of leaflets overprinted with their own names. Each gave us an undertaking that they would all be issued with its own bulb catalogue, and in this way over 33,000 leaflets were sent out to the gardening public.

These innovations necessitated the curtailment of the ordinary advertising in the gardening press, but in both cases we feel sure that it was well worth while. In connection with these matters, we should like to record the valuable help rendered by Mr. Burn. He has not only made many good suggestions, but has also relieved us of much trouble in regard to the details of printing and advertising.

Takesima Bulbs.—In 1929 we sold 52 cases of Bermuda Harrisii bulbs in small lots to various growers who supply the cut-flower market at Covent Garden.

This section of the trade uses by far the greater part of the total number of lilies imported; but, unfortunately, almost without exception they condemned the Harrisii as unsuitable, on account of the texture of the blooms being altogether too fragile for handling and travelling. We examined them ourselves and had to admit that what they said was true.

In the circumstances it would be useless to try to sell the Harrisii for this particular purpose, and the only course is to experiment, with a view to producing an article which is suitable. There is such a lily, and it is the Takesima or Dark Stemmed Longiflorum Giganteum. From the market grower's point of view it has every virtue, being easy to grow, tolerant of rapid forcing, remarkably strong in the texture of the blooms and moreover capable of withstanding the effects of cold storage for several months. If the growers could feel sure of receiving healthy and genuine Takesima bulbs, they would never look at anything else; but this is exactly their difficulty, for they cannot rely on the Japanese shippers. Over and over again they have been victimised, and if a reliable substitute were available, they would be thankful to buy it.

It comes to this; if Bermuda can produce a bulb which retains the virtues of the Takesima, and at the same time bears your guarantee of freedom from disease and conformity to type, there is a large trade almost for the asking. Even if you cannot produce a bulb that will cold-store, provided it has a strong flower, we can sell considerable quantities. For these reasons, the experiment which is now being made is of great importance. The opportunity may not occur again, because the Japanese are intelligent enough to realise, sooner or later, the need of "putting their house in order"; but it is a matter which is bound to take them some little time to carry out, and meanwhile there is a chance for Bermuda to step in.

Trade Conditions in Great Britain.—The bad state of general trade has been much felt in the horticultural industry. Two prominent firms have failed in the last few months, and certain others are none too strong.

Freesias.—Mr. Stephens kindly sent us samples and we have reported to him. This bulb offers possibilities because lately freesias have come into fashion. The white should be entirely separated from coloured varieties.

Roman Hyacinths.—This is worth an experiment, because it fetches a somewhat high price. Its value is entirely comprised in the fact that it

can be flowered for Christmas; therefore, the bulbs would need to be shipped in good time.

Bermuda Specialities.—We might be able to sell a few other Bermuda plants, such as Amaryllis, Crotons, etc. If samples could be sent, we would test the market.

We were very glad to see Dr. Cunningham, and our friends in the trade were particularly impressed with his quick grasp of points of commercial importance. He gave us much interesting information, and we hope that his first-hand report about conditions here will be of great benefit.

We cannot close our Report without a brief expression of our appreciation of the help and encouragement which we always receive from the Director of Agriculture. His sympathetic consideration and discussion of the points which have arisen have been of the very greatest assistance.

ROBERT TUCKER & CO.

London, 3rd November, 1930.

APPENDIX C

REPORT OF DELEGATES TO OTTAWA

Hamilton, Bermuda
10th December, 1930.

Sir,

We, the undersigned, appointed by His Excellency the Acting Governor a delegation to proceed to Ottawa for the purpose of presenting this Colony's case with respect to increases in north-bound freight rates put into effect by the Canadian National Steamships, beg to report that we obtained an assurance that the rate of freight which was charged during the season of 1929–1930 will continue in effect during the coming season.

2. We anticipate that these rates will be presented for consideration at the contemplated Conference in Ottawa in April or May next.

3. Enquiries were made regarding the shipment into Canada of Bermuda vegetables in bond through the United States of America. We ascertained that the Canadian National Steamships are not prepared to accept during the coming season freight for discharge at Boston because of the attitude of the Maritime Provinces.

4. Frequent shipment through New York, in bond, to Montreal and Toronto was considered necessary by the vegetable experts with whom we discussed the subject, in order to establish Bermuda vegetables in these markets. We were informed by the Department of National Revenue that the general tariff, that is, thirty per cent, would apply to vegetables so shipped. Definite information was not obtainable with respect to the duty which would be placed on Bermuda vegetables.

5. We recommend that immediate representation be made by the Government of Bermuda to the Government of Canada with respect to the necessity on our part to export vegetables to Montreal and Toronto by way of New York, and that we request that favourable tariff concessions be granted us under the peculiar circumstances.

6. Enquiry was made if the S. S. "Cathcart" and S. S. "Cavelier" could be alternated with the "Lady" boats on the Western Route. The management of the Canadian National Steamships are prepared to consider this, but were of opinion that it may be found that these steamers are likely to be fully loaded with bananas at the time they are most urgently required by Bermuda. The matter is being enquired into by the management, and no definite arrangements can be entered into before this enquiry is completed.

7. The winter schedule of the Canadian National Steamships, by which north-bound steamers on the Eastern and Western route will call at Bermuda on alternate intervals of two days and twelve days, was brought to the attention of the management, but no promise could be given us that the unsatisfactory arrangement could be remedied.

We have the honour to be,
Sir,
Your obedient servants,

J. P. HAND,
Chairman, Trade Development Board.

E. A. McCALLAN,
Director of Agriculture.

The Honourable,
The Colonial Secretary,
Hamilton.

APPENDIX D

MEMORANDUM PREPARED BY THE BERMUDA BOARD OF AGRICULTURE FOR THE CONSIDERATION OF THE GOVERNMENT OF CANADA

The Bermuda Board of Agriculture, on behalf of the vegetable growers of the Colony, desires to direct the attention of the Government of the Dominion of Canada to the following circumstances governing the export of Bermuda winter-grown vegetables to Canada, and respectfully begs that free entry be granted to Bermuda vegetables exported to Canada in bond through the United States of America under the conditions herein set forth.

2. Since the inception by the Canadian National Steamships of regular refrigerated and low-temperature steam service between Bermuda and Canada, the exports of vegetables (exclusive of onions and potatoes) from this Colony to the Dominion have increased 363 per cent. (See Table 1 attached). A larger increase would have occurred had not low rainfall reduced the crop of 1930.

3. The highly favourable tariff preferences now extended to Bermuda vegetables imported into Canada and the greatly increased United States tariff undoubtedly will immediately divert large quantities of Bermuda vegetables, particularly of celery, from the United States of America to Canada. From information obtained by surveys made in 1929 and 1930 of the vegetable markets of Eastern Canada, the Director of Agriculture of Bermuda is of opinion that the potential market in Canada for Bermuda vegetables is greater than the American market ever was, and it is anticipated that within a few years larger quantities of winter-grown vegetables will be exported from this Colony to Canada than were previously exported to the United States of America. During the ten years, 1920 to 1930, the Colony's exports of vegetables, of which more than 90 per cent were exported to the United States, averaged 397,371 bushels.

4. The profitable export from Bermuda of quickly maturing and perishable vegetables calls for frequent service, at least weekly, and in the case of celery semi-weekly sailings have been found necessary. A less frequent service causes much loss to growers by the over-maturing of vegetables, particularly with respect to celery, already intimated, and tomatoes.

5. In the initial stages of Bermuda's rapidly growing export vegetable trade to Canada, no assurance can be given with respect to probable shipments. That the quantities offered for shipment in 1931 will exceed the available refrigerated and low-temperature cargo space on the "Lady" steamers may be accepted, for such was the case on occasions in 1930.

6. It was with considerable satisfaction that the information was received in Bermuda of the intention of the Canadian National Steamships to call at Boston, Mass., and the Bermuda Board of Agriculture urgently request that permission be given this Colony to discharge at Boston vegetables consigned to Montreal and Toronto and carried by the "Lady" steamers and other subsidiary boats which may be employed on the Bermuda-Boston route by the Canadian National Steamships. This concession will materially reduce the time now required to ship Bermuda vegetables to Montreal and Toronto, the Colony's most important potential markets in Canada, and will undoubtedly immediately increase the Colony's shipments to Upper Canada.

7. Having regard to the refrigerated cargo space on the "Lady" steamers and the probable shipments of vegetables, and particularly celery, from Bermuda to Canada in 1931, the Board respectfully requests that the restrictions of Article VII of the Canada-West Indies Trade Agreement be removed and permission be granted this Colony to export to Canada by way of New York and other American ports such vegetables for which accommodation cannot be provided this season by steamers of the Canadian National Steamships. A comparison of the refrigerated cargo space on the "'Lady" steamers and the possible shipments from Bermuda indicates that adequate space cannot be provided by the Canadian National Steamships steamers.

8. The service established by the Canadian National Steamships has been essentially a fortnightly one, for a steamer on the western route and one on the eastern route have called at Bermuda within the same week on their north-bound trips, and no calls have been made during the week immediately following.

9. The refrigerated cargo space on the "Lady" steamers varies from 13,820 cubic feet to 14,255 cubic feet. In Table 2 will be found a tabular statement of the weekly (and in some cases semi-weekly) shipments of celery to New York in the years 1926 to 1929. (A celery crate occupies about 5 cubic feet of refrigerated space). A study of this schedule will show that on no less than sixteen occasions during the period 1926 to 1929, **weekly** (or semi-weekly) shipments of celery (and beets, carrots and parsley were shipped also) exceeded the total **fortnightly** refrigerated capacity of the steamers of the Canadian National Steamships on the 1930 schedule.

10. Frequent steam communication exists between Bermuda and New York. On a majority of the steamers on the Bermuda-New York route there is refrigerated cargo space, which in 1930 totalled 172,422 cubic feet on four steamers. Bermuda enjoys a monopoly of this space, a situation far different to that governing the steamers on the West Indies–Canada routes, for on them Bermuda shares with fourteen other ports, and is the last port of call on north-bound voyages. In 1931 the situation will undoubtedly be aggravated by increased shipments of fruits and vegetables from other ports.

11. A temporary concession, such as is the one asked for, will increase the Colony's shipments to Canada until they reach proportions which will warrant an extension of the service now established by the Canadian National Steamships.

12. Bermuda farmers are well aware that a weekly service is essential to a successful vegetable export trade. They are equally well aware of the limitations of the present Canadian service, and, therefore, are reluctant to plant extensively for the Canadian market. An early and favourable reply to the request herein made will establish confidence, and will increase the planting of vegetables for export to Canada in 1931.

E. A. McCALLAN,
Director of Agriculture.

22nd September, 1930.

TABLE 1.

Exports of Perishable Vegetables from Bermuda to Canada during the year immediately previous to service furnished by Canadian National Steamships, and during the two years such service has been in operation.

	1928	1929	1930
Beets	73	257	388
Cabbage	–	309	687
Carrots	4,458	11,652	16,841
Celery	35	4,041	8,551
Tomatoes	4,752	23,328	19,743
Miscellaneous	669	904	122
Total	9,987	40,491	46,332

Increase in two years, 363 per cent.

TABLE 2.

Exports of Bermuda Celery to New York
1925 to 1929 (in crates)

1925		1926		1927		1928		1929	
Apr. 4	10	Feb. 13	1	Apr. 16	15	Apr. 7	169	Mar. 23	42
" 11	24	Apr. 10	21	" 23	75	" 14	1016	Apr. 2	164
" 18	129	" 17	71	" 30	198	" 17	31	" 6	108
" 25	118	" 20	40	May 7	1548	" 21	2199	" 13	289
May 2	334	" 24	191	" 14	3301	" 24	309	" 16	185
" 9	1511	" 28	17	" 21	10485	" 27	2704	" 20	616
" 16	2236	May 1	748	" 28	9489	May 1	1324	" 23	246
" 23	2891	" 8	2683	June 4	9899	" 5	6653	" 27	2160
" 30	4178	" 15	5574	" 7	4246	" 8	1862	" 30	1382
June 6	4802	" 22	7459	" 11	8034	" 12	10272	May 4	4940
" 13	3377	" 29	7771	" 14	3743	" 19	10870	" 11	12394
" 20	758	June 5	7179	" 21	2932	" 26	10435	" 18	11521
" 27	167	" 9	1416	" 28	683	June 2	8291	" 25	13747
		" 12	2733	July 5	28	" 6	3855	June 1	12202
		" 14	1039			" 13	4023	" 5	6054
		" 22	378			" 19	362	" 11	4146
		" 29	12			" 27	223	" 18	2993
								" 25	417
Totals	20535		37233		54676		64598		73606

APPENDIX E

Expenditure (Exclusive of Salaries) for the Year Ended 31st December, 1930.

FEES TO MEMBERS OF BOARD.

Appropriated by Act No. 46, 1929		£ 70 0 0
Appropriated by Resolve No. 33, 1930		45 0 0
Paid to members for attendance	£ 108 0 0	
Unexpended balance	7 0 0	
	£ 115 0 0	£ 115 0 0

RENT ALLOWANCE OF PLANT PATHOLOGIST.

Appropriated by Act 46, 1929		£ 100 0 0
Paid to Plant Pathologist	£ 100 0 0	
	£ 100 0 0	£ 100 0 0

ASSISTANT INSPECTOR OF PRODUCE.

Appropriated by Act 46, 1929		£ 175 0 0
Paid in monthly wages	£ 162 10 0	
Unexpended balance	£ 12 10 0	
	£ 175 0 0	£ 175 0 0

SUB-INSPECTORS OF PRODUCE.

Appropriated by Act 46, 1929		£ 250 0 0
Paid in wages	£ 81 8 0	
Unexpended balance	168 12 0	
	£ 250 0 0	£ 250 0 0

GENERAL GRANT.

Appropriated by Act No. 46, 1929		£2,200 0 0
Labour on experimental plots, lawns, flower beds, glasshouses and drives, and care of live stock	£1,395 2 8	
Prison labour	11 14 0	
Carting and ploughing	155 9 0	
Manure and fertilisers	7 10 2	
Seed potatoes, seeds, bulbs and plants	125 17 4	
Live stock—feed, bedding and incidentals	277 16 7	
Repair and renewal of buildings, tools, etc	65 17 3	
Stationery and printing	135 18 1	
Foreign postage	19 0 0	
Cleaning offices	2 0 2	
Sundry	3 11 9	
Unexpended balance	– 3 0	
	£2,200 0 0	£2,200 0 0

INSPECTION SEVICES, MARKET INVESTIGATIONS AND CONTINGENCIES.

Appropriated by Act No. 46, 1929					£1,000	0 0
Appropriated by Resolve No. 44, 1930					65	0 0
Inspection of vegetables at dock	£	194	5	0		
Survey of Canadian market by Director		202	15	1		
Survey of Canadian market by Assistant Inspector of Produce		96	7	9		
Advertising vegetables in Canada		43	14	0		
Registration of Colonial Mark in Canada		5	4	3		
Experimental shipments to Canada and U. S. A.		15	8	0		
Inspection of seed potatoes on Long Island, N. Y.		6	12	9		
Advertising lilies in Great Britain		143	2	10		
Advertising lilies in Canada		23	12	7		
Potato and onion grader		96	9	2		
Cables		60	18	9		
Printing		20	6	5		
Lighting and cleaning Farmers' Market		5	12	11		
Subscription to marketing periodicals		8	11	0		
Supplies and contingencies		141	15	0		
Unexpended balance		–	4	6		
	£1,065	0	0		£1,065	0 0

IMPROVEMENT OF LIVE STOCK.

Appropriated by Act No. 46, 1929					£ 150	0 0
Purchase of dairy cattle	£	99	0	4		
Purchase of goat		6	19	3		
Purchase of rabbits		6	8	8		
Registration of cattle		2	2	0		
Subscriptions to live stock periodicals		4	15	4		
Supplies and contingencies		21	0	4		
Unexpended balance		9	14	1		
	£	150	0	0	£ 150	0 0

ERADICATION OF ANIMAL DISEASES.

Appropriated by Act No. 46, 1929					£ 75	0 0
Compensation to owners of condemned stock	£	14	0	0		
Supplies and contingencies		60	17	6		
Unexpended balance		–	2	6		
	£	75	0	0	£ 75	0 0

CONTROL OF PLANT DISEASES AND PESTS.

Appropriated by Act No. 46, 1929					£ 150	0 0
Labour	£	15	6	6		
Fungicides and insecticides		34	15	8		
Subscriptions to pathological periodicals		8	15	6		
Equipment and contingencies		91	0	9		
Unexpended balance		–	1	7		
	£	150	0	0	£ 150	0 0

ANNUAL AGRICULTURAL EXHIBITION.

Appropriated by Act No. 46, 1929					£	400	0 0
Labour, material and contingencies	£	400	0	0			
	£	400	0	0	£	400	0 0

HORTICULTURE.

Appropriated by Act No. 46, 1929					£	150	0 0
Labour	£	4	5	0			
Motor mower		41	11	5			
Tools, flower pots, etc		59	10	7			
Plants, seeds and bulbs		15	12	7			
Stationery and printing		16	13	4			
Subscriptions to horticultural periodicals		6	3	3			
Unexpended balance		–	–	4			
	£	150	0	0	£	150	0 0

REPRESENTATION AT BOTANICAL CONFERENCE, ENGLAND.

Appropriated by Act No. 46, 1929					£	170	0 0
Travelling expenses, subsistence and contingencies of Plant Pathologist	£	170	0	0			
	£	170	0	0	£	170	0 0

REPRESENTATION AT AGRICULTURAL CONFERENCE, TRINIDAD.

Appropriated by Act No. 46, 1929					£	120	0 0
Travelling expenses, subsistence and contingencies of Director	£	75	10	1			
Unexpended balance		44	9	11			
	£	120	0	0	£	120	0 0

REPRESENTATION AT TARIFF CONFERENCE, TRINIDAD.

Appropriated by Resolve No. 20, 1930					£	100	0 0
Travelling expenses, subsistence and contingencies of Director	£	68	16	11			
Unexpended balance		31	3	1			
	£	100	0	0	£	100	0 0

DEPARTMENTAL CONTINGENCIES, TRAVELLING EXPENSES, TELEPHONES, LIGHTING, ETC.

Appropriated by Act No. 46, 1929					£	120	0 0
Carriage hire	£	14	4	0			
Boat transportation		2	11	8			
Bicycle allowance		47	0	0			
Telephones		14	7	6			
Electric light and power		7	1	9			
Stationery		8	12	0			
Foreign postage		1	5	0			
Supplies and contingencies		23	12	7			
Unexpended balance		1	5	6			
	£	120	0	0	£	120	0 0

PACKING HOUSE, SERVICES AND CONTINGENCIES.

Appropriated by Resolve No. 12, 1930				£2,000	0	0
Appropriated by Resolve No. 44, 1930				100	0	0
Erection of house, labour	£ 154	9	6			
" " material	347	12	7			
Grader and other machinery	505	9	2			
Installation of electricity, cost of light and power	24	17	1			
Crates, labels, wrappers, liners	968	3	0			
Packing tomatoes, labour	62	9	0			
Cartage	16	2	6			
Experimental shipments	3	18	3			
Contingencies	4	7	8			
Unexpended balance	12	11	3			
	£2,100	0	0	£2,100	0	0

APPENDIX F

Statement of Reimbursements to Government, and Value of Produce Supplied to Other Institutions During the Year Ended 31st December, 1930.

1. REIMBURSEMENTS TO GOVERNMENT.

Sale of vegetables	£104	15	4
Sale of plants	13	0	3
Sale of seeds	5	5	0
Lily certificates	8	4	0
Spraying services	11	16	2
Registration fees of seedsmen	1	15	0
Live stock fees and sales	102	3	0
Hire of potato grader	1	0	0
	£247	18	9

2. PRODUCE SUPPLIED TO OTHER INSTITUTIONS.

Milk to King Edward VII Memorial Hospital	£129	7	0
Vegetables to King Edward VII Memorial Hospital	31	18	0
Vegetables to other institutions	17	1	0
	£178	6	0